CONTENTS

	Page	
FOREWORD	v	1/A7
PARTS AND METHOD OF INDEXING ABSTRACTS	vii	1/A9
ABSTRACT	ix	1/A11
INTRODUCTION	ix	1/A11
Design Philosophy	xii	1/B1
Instructions for Using Bibliography	xv	1/B5
References	xviii	1/B8
BIBLIOGRAPHY	xxi	1/B11
1. General Safety Considerations	1	1/B12
2. Siting of Nuclear Facilities	8	1/C5
3. Transportation and Handling of Radioactive Materials	9	1/C6
4. Aerospace Safety (inactive, not included)		
5. Heat Transfer and Thermal Hydraulics	10	1/C7
6. Reactor Transients, Kinetics, and Stability	16	1/C13
7. Fission Product Release, Transport, and Removal	19	1/D2
8. Sources of Energy Release under Accident Conditions	22	1/D5
9. Nuclear Instrumentation, Control, and Safety Systems	24	1/D7
10. Electrical Power Systems	28	1/D11
11. Containment of Nuclear Facilities	29	1/D12
12. Plant Safety Features — Reactor	36	1/E5
13. Plant Safety Features — Nonreactor	38	1/E7
14. Radionuclide Release, Disposal, Treatment, and Management (inactive, not included)		
15. Environmental Surveys, Monitoring, and Radiation Dose Measurements (inactive, not included)		
16. Meteorological Considerations	41	1/E10
17. Operational Safety and Experience	42	1/E11
18. Design, Construction, and Licensing	46	1/F1
19. Internal Exposure Effects on Humans Due to Radioactivity in the Environment (inactive, not included)		
20. Effects of Thermal Modifications on Ecological Systems (inactive, not included)		
21. Radiation Effects on Ecological Systems (inactive, not included)		
22. Safeguards of Nuclear Materials	51	1/F6
KEYWORD INDEX	53	1/F8
AUTHOR INDEX	61	1/G2
PERMUTED-TITLE INDEX	65	1/G6

OAK RIDGE NATIONAL LABORATORY

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ORNL/NUREG/NSIC-151
(Vol. 6 of ORNL/NUREG/NSIC-125)

LMFBR SAFETY

6. Review of Current Issues and Bibliography of Literature 1977

J. R. Buchanan · G. W. Keilholtz

110

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LMFBR SAFETY

6. REVIEW OF CURRENT ISSUES AND BIBLIOGRAPHY OF LITERATURE (1977)

J. R. Buchanan
Engineering Technology Division

G. W. Keilholtz
Science Applications, Inc.

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FOREWORD

The Nuclear Safety Information Center (NSIC), which was established in March 1963 at Oak Ridge National Laboratory, is principally supported by the U.S. Nuclear Regulatory Commission's Office of Nuclear Regulatory Research. Support is also provided by the Division of Reactor Development and Demonstration of the Department of Energy. NSIC is a focal point for the collection, storage, evaluation, and dissemination of safety information to aid those concerned with the analysis, design, and operation of nuclear facilities. Although the most widely known product of NSIC is the technical progress review *Nuclear Safety*, the Center prepares reports and bibliographies as listed on the inside covers of this document. The Center has also developed a system of key words to index the information which it catalogs. The title, author, installation, abstract, and key words for each document reviewed are recorded at the central computing facility in Oak Ridge. The references are cataloged according to the following categories:

1. General Safety Criteria
2. Siting of Nuclear Facilities
3. Transportation and Handling of Radioactive Materials
4. Aerospace Safety (inactive ∿1970)
5. Heat Transfer and Thermal Hydraulics
6. Reactor Transients, Kinetics, and Stability
7. Fission Product Release, Transport, and Removal
8. Sources of Energy Release under Accident Conditions
9. Nuclear Instrumentation, Control, and Safety Systems
10. Electrical Power Systems
11. Containment of Nuclear Facilities
12. Plant Safety Features — Reactor
13. Plant Safety Features — Nonreactor
14. Radionuclide Release, Disposal, Treatment, and Management (inactive September 1973)
15. Environmental Surveys, Monitoring, and Radiation Dose Measurements (inactive September 1973)
16. Meteorological Considerations

17. Operational Safety and Experience
18. Design, Construction and Licensing
19. Internal Exposure Effects on Humans Due to Radioactivity in the Environment (inactive September 1973)
20. Effects of Thermal Modifications on Ecological Systems (inactive September 1973)
21. Radiation Effects on Ecological Systems (inactive September 1973)
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Computer programs have been developed that enable NSIC to (1) operate a program of selective dissemination of information (SDI) to individuals according to their particular profile of interest, (2) make retrospective searches of the stored references, and (3) produce topical indexed bibliographies. In addition, the Center Staff is available for consultation, and the document literature at NSIC offices is available for examination. NSIC reports (i.e., those with the ORNL/NSIC and ORNL/NUREG/NSIC numbers) may be purchased from the National Technical Information Service (see inside front cover). All of the above services are free to NRC and DOE personnel as well as their direct contractors. They are available to all others at a nominal cost as determined by the DOE Cost Recovery Policy. Persons interested in any of the services offered by NSIC should address inquiries to:

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GENERAL ELECTRIC CO., SUNNYVALE, CALIF. ADVANCED PRODUCTS OPERATION
GEAP-5416 +. 72 PAGES, FIGURES, TABLES, REFERENCES, JANUARY 1967

ACRS-00023

PREMATURE FAILURES WERE OBSERVED IN ONE 0.008-IN.-WALL ROD AND IN ONE 0.012-IN.-WALL ROD OF THE MARK-III EXPERIMENTAL FUEL. CLADDING IS INCOLOY-800. FAILURES WERE IN REGION OF MAXIMUM POWER IN PEAK-POWER ROD. MOST REASONABLE EXPLANATION IS LOW-CYCLE FATIGUE, ACCELERATED BY HIGHER-THAN-DESIGN CLADDING TEMPERATURES. NO SIGNS OF RAPID CORROSION, SUCH AS HAVE BEEN ASSOCIATED WITH TYPE-304 SS, WERE FOUND.

ABSTRACT OF ORIGINAL DOCUMENT

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*FAILURE, FUEL ELEMENT + CLAD + FAILURE, FATIGUE + INCONEL + REACTOR, INTERNAL SUPERHEAT + THERMAL MECHANICAL EFFECT + VESR (ISR)

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LMFBR SAFETY

6. REVIEW OF CURRENT ISSUES AND BIBLIOGRAPHY OF LITERATURE (1977)

J. R. Buchanan
Engineering Technology Division

G. W. Keilholtz
Science Applications, Inc.

ABSTRACT

This report discusses the current status of liquid-metal fast breeder reactor (LMFBR) development. Selected bibliographic information on LMFBRs relative to the development and safety of the breeder reactor is presented for the year 1977. The bibliography consists of approximately 198 abstracts covering research and development, operating experience, and design practices. Keyword, author, and permuted-title indexes are included for completeness.

INTRODUCTION

This bibliography of abstracts of literature relating to the liquid-metal fast breeder reactor (LMFBR) from the computer file of the Nuclear Safety Information Center (NSIC) provides valuable background information for those engaged in research, design, analysis, and licensing of breeder reactors. This is the sixth volume of a series on LMFBR safety and covers selected literature added to the NSIC computer file in 1977. This introduction to the bibliography includes a brief discussion of the current status of breeder development.

The Energy Research and Development Administration (ERDA), its predecessor the Atomic Energy Commission, and others have considered the development of the breeder reactor to be essential to the assurance of adequate long-range supplies of nuclear fuel.[1,2] The LMFBR is the favored fast breeder reactor system in Great Britain, Federal Republic of Germany, the U.S.S.R., Japan, Italy, and France. However, the United States is currently pursuing a policy of nonproliferation of plutonium, which is an important component of nuclear weapons. Since plutonium production is also inherent in the current LMFBR fuel cycle, the U.S. breeder program

is under critical review. The recently created Department of Energy is evaluating various breeder cycles with the goal of establishing a proliferation-proof fuel cycle. At this writing, the future of the Clinch River Breeder Reactor Plant (CRBRP) is uncertain.

Current-generation LMFBRs use mixed-oxide (plutonium-uranium) fuel cooled by liquid sodium. Coolant temperatures range from 400°C (750°F) at the core inlet to 540°C (1000°F) at the outlet while the system is kept at a low pressure of 2 to 10 atm.[3] The feasibility of developing commercially attractive LMFBRs in the U.S. is founded on the extensive body of both light-water reactor (LWR) experience and sodium reactor technology.[4-9] The latter includes several years of experience each with the Sodium Reactor Experiment and the Hallam, SEFOR, and Fermi reactors; 10 years of operating experience with the Experimental Breeder Reactor (EBR-II) plus experience with its predecessor EBR-I;[10] the fuels and manufacturing technology developed for the Fast-Flux Test Facility (FFTF);[11] and the component designs for the CRBRP;[12,13] as well as the utilization of data and experience gained from the LMFBR development programs in Europe.[14-23] Selected plant characteristics are given in Table 1 for the world's LMFBRs.[13]

As for any nuclear reactor, the safety of the fast reactor depends upon ensuring the continuity of heat removal from the hot radioactive core. At the same time provisions must be made for shutting down the reactor (i.e., terminating the nuclear fission process) when required, so that heat production after shutdown is by decay heat only. Thus, a major task is to ensure that the reactor can be shut down, or scrammed, when required. All shutdown system designs of the present generation incorporate two independent neutron-absorber systems. Less than half the capacity of either system is usually sufficient to scram the reactor. Swelling and creep phenomena in materials due to radiation-induced void formation has received considerable attention. The removal of decay heat, generally through diverse heat-removal systems, is recognized as a major design objective. Other areas of investigation relate to the energetics and mechanical consequences of a core-disruptive accident. Major research and development programs are under way to provide further understanding

Table 1. Characteristics of various LMFBR plants

Reactor	Nation	Criticality[a]	Power [MW(t)]	Fuel	Fuel loading (kg_m)	Heat transport system[b,c]
EBR-1	U.S.	1951	1.2	U	64	1 loop
BR-5	USSR	1958	5→10	PuO_2(UC)	49.6	2 loop
DFR	U.K.	1959	60	UO_2	200	24 loop
EBR-II	U.S.	1963	62.5	U	363	Pool
Enrico Fermi	U.S.	1963	300	U	2000	3 loop
Rapsodie	France	1966	20→40	Pu-UO_2	300	2 loop
SEFOR	U.S.	1969	20	Pu-UO_2	1920	1 loop + ACS
BOR-60	USSR	1970	60	UO_2	176	2 loop
FARET[d]	U.S.	1972	50	Pu-UO_2	260	1 loop + ACS
BN-350	USSR	1972	1000	Pu-UO_2	2050	6 loop
Phenix	France	1973	560	Pu-UO_2	3500	Pool
PFR	U.K.	1974	600	Pu-UO_2	6000	Pool
FFTF	U.S.	1978	400	Pu-UO_2	3000	3 loop
JOYO	Japan	1977	100	Pu-UO_2	903	2 loop + ACS
BN-600	USSR	1979	1470	Pu-UO_2	3900	Pool
SNR-300	F.R. Germany	1981	736	Pu-UO_2	5000	3 loop + ACS
PEC	Italy	1980	~125	Pu-UO_2	?	2 loop semipool
MONJU	Japan	1983	540	Pu-UO_2	7900	3 loop
Super Phenix	France	1982	2900	Pu-UO_2	?	Pool
CRBRP	U.S.	1983	975	Pu-UO_2	7561	3 loop

[a]The dates given are the latest published dates and in some instances may be optimistic.

[b]ACS = Auxiliary Cooling System.

[c]The loop system uses pipes to connect the reactor vessel, coolant pump, and heat exchanger; whereas the pool concept immerses the core, heat exchanger, and coolant pump in a single pool of sodium. The former has a smaller vessel, a smaller inventory of sodium, and greater ease in isolating components for maintenance. The pool-type system has a greater heat capacity because of the larger sodium inventory, and since there are no external pipes in this system, there is less concern about leakage.

[d]The FARET project was canceled in 1965.

of these safety phenomena, and ultimate development of the breeder in the U.S. depends upon successful completion of this effort.

The Comptroller General of the U.S. in a report[24] to Congress found that "there are . . . environmental and safety uncertainties regarding the LMFBR that remain to be resolved. These include hypothetical core-disruptive accidents which may lead to . . . recriticality. . . . Only the recriticality issue is unique to the LMFBR and other fast reactors. The other issues are common to nuclear fission power in general, but their resolution is critical because the LMFBR would exacerbate the problems."

The LMFBR has one very important safety advantage over the LWR;[25] that is, there is no need for high-pressure components within the reactor containment. With no natural pressure source, the concern then becomes a question of whether there are any combinations of malfunctions that could lead to a power excursion of sufficiently high ramp rate to generate excessive pressure. Other advantages accrue from the good heat-transfer characteristics of the sodium and its chemical reactivity, which make it efficient in retaining many fission products. On the other hand, the rapid oxidation, or burning, of sodium is an important safety concern of the LMFBR as is, in the case of large LMFBRs, the reactivity associated with incidents that lead to voiding of sodium near the center of the core.

Design Philosophy

The approach to safety in the design of LMFBRs is similar to the "defense-in-depth" philosophy used in LWR design[26] (see Table 2). The philosophy, founded on the supposition that the probability of accidents decreases rapidly with their severity, defines three levels of safety:[13]

1. Care in design, construction, and operation.

2. Standby engineered safety features such as redundant decay-heat-removal systems, emergency power systems, and two independent shutdown systems that are designed to control the consequences of equipment failures, operator error, and anticipated transients.

3. Other features, such as dynamic loading conditions for specific components, the reactor vessel, or containment structure, designed to

Table 2. Multilevel safety design of an LMFBR plant

Level	Objective	Operating category	Typical events within operating capacity	Typical safety design features
1	Provision of a plant of simple, reliable, and functional design free of defects, with inherent safe performance, fabricated and operated to the highest proven standards	Normal operation	Events that will normally occur: Full-power operation Startup and shutdown Random fuel-pin failure Refueling	Fuel assembly design to prevent flow blockage Fuel of proven performance through life Core restraint to provide negative power coefficient Adequate Doppler coefficient Low-pressure coolant system with wide margin to boiling Maximum use of proven technology and hands-on maintenance Radioactive-waste-treatment system
2	Provision of protection systems to provide adequate response of system in the event of all identified transients	Anticipated faults	Events that, based on experience, are expected to occur at least once in the life of the plant: Loss of off-site power Loss of power to one pump Operator error Spurious scrams	Multiple reactor coolant loops Decay-heat-removal redundancy Battery power supplies for vital services Guard vessels for leak protection Inert atmospheres in sodium cells
		Unlikely faults	Events which are not expected to occur individually but which might occur once during the life of the plant, based on the total list of such events: Pump seizure Failure of dump system Steam-generator leak	Two independent shutdown systems Sodium-water reaction protection system
3	Provision of extra capability to cope with extremely unlikely events that are never expected to occur and additional design requirements to provide prudent margin for unforeseen events	Extremely unlikely faults	Events that are never expected to occur: Maximum flood, or earthquake, or tornado Large sodium fire Large sodium-water reaction	Site selection Flood barriers Containment isolation Low-leakage containment
		Hypothetical events	Design margins to provide for unforeseen events	Capability to accept extra thermal loads in the core support structure Capability to accept dynamic loads in vessel and primary system components Geometric requirements around the vessel Control-room radiological protection

control the consequences of events such as a major core-disruptive accident that have been judged to be of low probability.

The first level of safety emphasizes accident prevention through intrinsic design features such as quality assurance, redundancy, testability, inspectability, and fail-safe characteristics.

The second level of safety is implemented in the plant protection systems, reliability programs, heat-removal-system protection, redundant power supplies, etc. An extensive reliability program is currently under way for the CRBRP to help set the design basis for the plant protection system.[27] The reliability criterion used is that stated in the regulatory guidance provided for the analogous accident in LWRs, "Anticipated Transient Without Scram" (ATWS),[28] as follows: "The safety objective is that the likelihood of all accidents with significant consequences not included in the design basis envelope should not be greater than one in one million per year, i.e., should not occur with a failure rate greater than 10^{-6} per year. For the particular potential failure path of ATWS, the staff believes that a failure rate of the order of one-tenth of the overall safety objective is an appropriate objective."

The third level of safety supplements the first two by providing plant response to low-probability faults. Analysis of the hypothetical core-disruptive accident (HCDA) illustrates the present state of technology in treating the third level of safety and shows that the provision of design margin involves an evaluation of the entire reactor plant. The core-disruptive accident is the most controversial area of LMFBR safety evaluation. The prime conceivable mechanistic initiator of a core-disruptive accident is a combination of events, such as complete loss of coolant flow, with a total inability to shut down the reactor (i.e., a disabling failure in the second level of safety). For this reason, a major effort is being put forth in the LMFBR development program to demonstrate that the reliability of scram, as well as system structural integrity and post-shutdown core cooling, is so high as to preclude choice of the HCDA as a design basis.

Recently to supplement the three levels of safety, DOE has been developing four lines of assurance (LOA) identified as follows:[29]

LOA 1 — Prevent accidents

LOA 2 — Limit core damage

LOA 3 — Control accident progression

LOA 4 — Alternate radiological consequences

Instructions for Using the Bibliography

The abstracts in this bibliography were selected from the NSIC computer file using REACTOR, LMFBR, and REACTOR, LMCR as keywords. The document descriptions added to the file prior to 1970 are found in Vol. 1 (ORNL/NUREG/NSIC-125); those for 1970 to 1972 are in Vol. 2 (ORNL/NUREG/NSIC-129); those for 1972 to 1974 are in Vol. 3 (ORNL/NUREG/NSIC-132); those for 1975—1976 are in Vol. 5 (ORNL/NUREG/NSIC-139); and this volume contains selections from abstracts added to the file in 1977. Abstracts added after 1977 will be issued in follow-up volumes covering periods of approximately one year.

The previous volumes in this series (1 through 5) included all abstracts added to the computer file during the period covered. This volume was composed in a different manner. Rather than publishing the entire collection of over 1600 abstracts, we selected 198 of the most interesting and representative to include in this bibliography. Some were selected from each of the active NSIC categories. Users of this bibliography who wish to see the abstracts not included herein are encouraged to request a retrospective search of the NSIC computer files based upon a keyword or combination of keywords of interest. There is no charge for this service to Nuclear Regulatory Commission (NRC) and Deparment of Energy (DOE) personnel or their direct contractors.

The abstracts in this volume are sorted into the NSIC category scheme and listed essentially in chronological order, with the assigned accession numbers in numerical order. The bibliography is followed by keyword, author, and permuted-title indexes.

A brief explanation of the scope of each category* in which the abstracts are presented follows:

1. General Safety Considerations — Deals with all safety aspects of radiation policy, safeguards, standards, codes, cost, financial liability, and insurance. Also covers the comparative risk to public health and safety from nuclear and nonnuclear hazards.

2. Siting of Nuclear Facilities — Considers factors used in evaluating sites, for example, facility design, proposed operation, population density, use characteristics of the environs, physical characteristics of the site, and earthquake considerations.

3. Transportation and Handling of Radioactive Materials — Pertains to shipping containers, shipping regulations, criticality safety, transportation accidents, design of tiedowns, shipping condition (impact, fire, vibration, etc.), heat-transfer capability, etc.

5. Heat Transfer and Thermal Hydraulics — Considers all facets of the analysis of postulated accidents. Includes burnout heat flux, heat transfer, reliability analysis, thermal-mechanical effects, in-reactor experiments, coolant-activity buildup, and experiments such as in LOFT.

6. Reactor Transients, Kinetics, and Stability — Includes the studies, analytical and experimental, such as those conducted in TREAT and SPERT, in which the transient behavior of reactors and criticality accidents are examined. Deals, for example, with reactivity effects due to voids and temperature, Doppler coefficient, etc.

7. Fission Product Release, Transport, and Removal — Pertains to the release of fission products from various materials and their movement within a nuclear facility containment system. Transport of fission products involves the physical and chemical characterization of the released radionuclides and also includes mechanisms such as deposition, adsorption, filtration, fallout, plateout, etc.

8. Sources of Energy Release Under Accident Conditions — Considers nuclear, Wigner, and gamma energies, energy release by chemical reactions,

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*Categories 4, 14, 15, and 19 through 21 are inactive; therefore, they are not included.

metal-water reactions, and all other types of energy that might be released as a result of a nuclear accident.

9. Nuclear Instrumentation, Control, and Safety Systems — Includes the design of control and safety systems for various nuclear processes, as well as the required instrumentation and hardware. The problems involved are the performance required of safety systems; the specification of instrumentation; the concepts of coincidence, redundance, failure modes, and reliability; adequacy of shutdown margins; design features of mechanical devices; and related subjects.

10. Electrical Power Systems — Deals with routine and emergency means of supplying electrical power to nuclear facilities of any kind. Includes all phases of the generation and distribution of electrical power to and within a nuclear power plant. Considers the reliability of the power system and the effects of system disturbances on safety and operation of the reactor.

11. Containment of Nuclear Facilities — Encompasses all aspects of pressure containment for all types of nuclear facilities. Includes fuel cladding, piping, pressure vessels, containment, and reactor buildings. Major concerns are design considerations, penetrations, structural integrity, leak testing, quality assurance, and radiation damage.

12. Plant Safety Features — Reactor — Covers all engineered safety features of reactors except containment. Includes systems for reducing temperature and pressure, air cleaning, disposal of liquid waste, and emergency core cooling. Other topics include maintenance, decontamination, fuel-element protective devices, etc.

13. Plant Safety Features — Nonreactor — Deals with facilities associated with the external fuel cycle and with the use of radioactive materials created by nuclear fission. Major divisions are mining, ore conversion, enrichment, fuel-element fabrication, hot cells, fuel processing, fuel conversion, waste disposal, and radioisotopes.

16. Meteorological Considerations — Considers not only diffusion and deposition of radioactive material near the surface of the earth in connection with reactor operations, but also the atmospheric transport and fallout in the troposphere and stratosphere as a result of nuclear weapons tests.

17. Operational Safety and Experience — Covers the safety aspects of routine reactor operation and of incidents or unusual operating occurrences, large and small. Includes power, research, and test reactors, also fuel-processing plants.

18. Design, Construction, and Licensing — Deals largely with safety-analysis and design reports for reactors not yet operational. The reports are generated by facility designers and by the NRC Regulatory Staff.

22. Safeguards of Nuclear Materials — Includes the topics of theft or diversion of nuclear materials, safeguards research and rule-making, protection against sabotage, nonproliferation, and consideration of postulated malevolent nuclear acts.

References on mathematical models and codes usually appear in Category 5 or 18; however, some may be expected to occur in any of the categories depending on the subject matter of the model or code.

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1. GENERAL SAFETY CONSIDERATIONS

118532
MEGY JM + CONTE F + NOEL H + GODDET J
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE
COMMISSARIAT A L'ENERGIE ATOMIQUE, FRANCE + ELECTRICITE DE FRANCE, PARIS
7 PPS, 3 TABS, COMBUSTION, 47(12), PP. 25-31 (JUNE 1976)

THE OBJECTIVE WAS TO CONFIRM THE VALIDITY AND RELIABILITY OF THE ENTIRE SYSTEM BY SHOWING THAT IT WAS POSSIBLE TO BUILD A FAST-NEUTRON POWER PLANT AND TO OPERATE IT SATISFACTORILY. PRELIMINARY STUDIES STARTED IN 1965 CONSTRUCTION AND FABRICATION STARTED IN 1969. CONSTRUCTION WORK WAS PRACTICALLY COMPLETED IN 1972, AND CRITICALITY WAS ACHIEVED IN AUGUST 1973. THE AVAILABILITY FACTOR FOR 1975 WAS 70.26%. THE OVERALL INSTALLATION DEMONSTRATES ALMOST PERFECT STABILITY BOTH WITH RESPECT TO THE REACTOR AND THE BALANCE OF THE PLANT. OPERATOR INTERVENTIONS ARE INFREQUENT. AN EXAMINATION OF THIS SURVEY SHOWS THAT LAUNCHING THE CONSTRUCTION OF SUPER PHENIX HAS EXCELLENT CHANCES OF SUCCESS.

REACTOR, LMFBR + PHENIX (LMFBR) + CONSTRUCTION + TESTING + OPERATION + COMPONENTS

118533
NEMZEK TA
PROSPECTS AND IMPACTS OF BREEDER COMMERCIALIZATION
U.S. ERDA, WASHINGTON
4 PPS, 5 FIGS, COMBUSTION, 47(12), PP. 21-24 (JUNE 1976)

REQUIRES LOOKING AHEAD 25 YEARS WITH RESPECT TO U.S. ELECTRIC ENERGY NEEDS AND THE CONTRIBUTION THAT FISSION ENERGY CAN MAKE IN FULFILLING THOSE NEEDS. FOUR POINTS ARE PREREQUISITE TO UNDERSTANDING THE FUTURE: (1) ELECTRICAL ENERGY DEMAND GROWTH BETWEEN 4-5% PER YEAR; (2) THE GROWTH MUST BE ACCOMMODATED PRINCIPALLY BY COAL AND NUCLEAR; (3) THE RATE OF GROWTH OF NUCLEAR FOR THE LOW GROWTH CASE GIVES 200 GWE BY 1996, 800 GWE BY 2000; AND (4) THE BREEDER IS NECESSARY FOR LONG TERM USE OF THE FISSION ENERGY OPTION. COAL IS PLENTIFUL, BUT THE COAL MINING IS FACING AN ENORMOUS TASK OVER THE NEXT QUARTER CENTURY. THE ACCUMULATING DEPLETED URANIUM STOCKPILE FROM THE URANIUM ENRICHMENT PLANTS REPRESENTS A TREMENDOUS, PRE-MINED RESOURCE FOR THE BREEDER INDUSTRY.

REACTOR, BREEDER + REACTOR, LMFBR + URANIUM + FORECAST + ELECTRIC POWER + COAL

118534
LIQUID METAL FAST BREEDER REACTOR: DECISION PROCESS AND ISSUES
7 PPS, COMBUSTION, 47(12), PP. 14-20 (JUNE 1976)

A SERIES OF CHARTS ARE GIVEN TO HELP CLARIFY THE DECISION MAKING PROCESS ON WHETHER PROGRESS OF THE LMFBR SHOULD BE SLOWED OR ACCELERATED - BASED ON ELECTRIC DEMAND, COAL TECHNOLOGY, AND URANIUM SUPPLY. PERHAPS THE MOST IMPORTANT UNCERTAINTY WITH RESPECT TO TIMING IS THE INCREASE IN DEMAND FOR ELECTRICITY. IF COAL CAN BE USED IN AN ENVIRONMENTALLY EXCEPTABLE MANNER, AND IF MINING AND RAILROAD REQUIREMENTS CAN BE MET, THEN LMFBR DEVELOPMENT SHOULD BE SLOWED. BUT IT IS EXPECTED THAT COAL WILL BE EXPENSIVE. AVAILABILITY OF URANIUM IS AN UNCERTAINTY IN PLANNING.

REACTOR, LMFBR + R AND D PROGRAM + ECONOMICS + COAL + URANIUM + RESOURCE, NATURAL

119262
BODANSKY D + SCHMIDT FH
SAFETY ASPECTS OF NUCLEAR ENERGY
UNIVERSITY OF WASHINGTON
47 PPS, PP. 9-54, BOOK PUBLISHED BY PRENTICE-HALL INC., ENGLEWOOD CLIFFS, N.J., 1976

CHAPTER 1 OF THE BOOK 'THE NUCLEAR POWER CONTROVERSY' DEALS WITH THE TECHNICAL ASPECTS OF REACTOR SAFETY AS WELL AS WASTE STORAGE AND PLUTONIUM DIVERSION. THE PAPER IS INTENDED AS A BRIEF INTRODUCTION TO THE TECHNICAL ASPECTS OF NUCLEAR POWER PRODUCTION AND AN IDENTIFICATION OF THE CHIEF AREAS OF CONFLICT. THESE MATTERS ARE, OF COURSE, CENTRAL TO ANY CONSIDERATION OF NUCLEAR POWER.

N-POWER, SAFETY OF + POWER PLANT, NUCLEAR + RADIATION EFFECT + PLUTONIUM + WASTE HANDLING + ACCIDENT, LOSS OF COOLANT + REACTOR, BREEDER + BROWNS FERRY 3 (BWR) + FIRE + SABOTAGE + THEFT/DIVERSION

120096
OTT KO
RISK-ASSESSMENT METHODOLOGY FOR FAST BREEDER REACTORS
ARGONNE NATIONAL LABORATORY, ILLINOIS
ANL-76-39 +, 58 PPS, 12 FIGS, 17 REFS, APRIL 1976

ALL METHODS ARE BASED ON THE CALCULATION OF ACCIDENT CONSEQUENCES FOR RELATIVELY FEW ACCIDENT SCENARIOS. UNCERTAINTIES IN FAST-REACTOR ACCIDENT ANALYSIS ARE DISCUSSED. THIS DISCUSSION SHOWS THE NEED FOR IMPROVEMENT OF THE METHODOLOGY. A GENERALIZED AND IMPROVED RISK-ASSESSMENT METHODOLOGY IS OUTLINED AND PROPOSED (ACCIDENT-SPECTRA-PROGRESSION APPROACH), WHICH CONSISTS OF AN EXPLICIT TREATMENT OF UNCERTAINTIES THROUGHOUT THE ACCIDENT PROGRESSION. THE ASSESSMENT OF THE RISK OF ONE OR A CERTAIN NUMBER OF NUCLEAR REACTORS CAN ONLY PROVIDE AN 'ISOLATED' RISK ASSESSMENT. THE GENERAL PROBLEM OF SAFETY RISK ASSESSMENT AND ITS RELATION TO PUBLIC ACCEPTANCE OF CERTAIN MODES OF POWER PRODUCTION IS A MUCH BROADER PROBLEM AREA, WHICH IS ALSO DISCUSSED.

120096 *CONTINUED*
AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

BENEFIT VS RISK + REACTOR, FAST + REACTOR, BREEDER + MATHEMATICAL TREATMENT + JACOBS

121108
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO
1 PG. NUCLEAR NEWS, 20(1), PG. 37 (JAN. 1977)

THE GENERAL ACCOUNTING OFFICE HAS PROJECTED THAT THE FUEL CYCLE TECHNOLOGIES--REPROCESSING, FUEL FABRICATION, AND WASTE DISPOSAL--ASSOCIATED WITH THE LIQUID-METAL FAST BREEDER REACTOR ARE MORE LIKELY TO SLOW UP THE COMMERCIALIZATION OF THE LMFBR THAN THE DEVELOPMENT OF THE REACTOR ITSELF. THE GAO JUDGES THE LMFBR FUEL CYCLE TECHNOLOGIES TO BE LAGGING, AND THIS CONDITION MAY ALLOW ONLY FOUR TO SIX COMMERCIAL LMFBR'S TO BE IN OPERATION BY THE YEAR 2000. THE GAO RECOMMENDED THAT ERDA ASSEMBLE A MORE COORDINATED DEVELOPMENT PROGRAM FOR THE LMFBR AND ITS THREE SUPPORT TECHNOLOGIES.

FUEL CYCLE + REACTOR, LMFBR + AGENCY, ERDA + LEGALISTICS + FUEL REPROCESSING + WASTE MANAGEMENT

121153
WEINBERG AM
ENERGY POLICY AND ENERGY PROJECTIONS: THE CASE OF A NUCLEAR MORATORIUM
INST. FOR ENERGY ANALYSIS, OAK RIDGE, TENN.
14 PPS. PRESENTED AT ATOMIC INDUSTRIAL FORUM CONFERENCE ON U.S. ENERGY POLICY; WASHINGTON, D.C., JAN. 11, 1977

ENERGY NEEDS HAVE BEEN RE-EVALUATED AND NEW ESTIMATES AGREE CLOSELY WITH THE FORD FOUNDATION STUDY OF 1974 - FOR THE YEAR 2000 FROM 101 TO 126 QUADS. USING THESE LOWER ESTIMATES OF ENERGY NEEDS, A STUDY IS MADE OF A NUCLEAR MORATORIUM WHERE EITHER COAL OR SOLAR ENERGY WOULD HAVE TO SUPPLY ENERGY NEEDS. IT SEEMS VERY DOUBTFUL IF SOLAR COULD EVER BE ANY MORE THAN SUPPLEMENTARY, AND THE MAJOR RESTRICTION ON A COAL ECONOMY WOULD PROBABLY BE THE CO2 CATASTROPHE. THESE NEW PROJECTIONS SUGGEST THAT WE MAY HAVE MORE TIME FOR THE TRANSITION TO A LONG-RANGE FUTURE BASED ON BREEDERS THAN FIRST SUSPECTED.

AVAILABILITY - INSTITUTE FOR ENERGY ANALYSIS, OAK RIDGE ASSOCIATED UNIVERSITIES, OAK RIDGE, TENN. 37830

ENERGY + FORECAST + FUEL, NUCLEAR + FUEL, FOSSIL + REACTOR, BREEDER + CARBON DIOXIDE

122105
APOSTOLAKIS GE + CAVE L + EPLER EP + ILBERG D + KASTENBERG WE
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976
UNIVERSITY OF CALIFORNIA, LOS ANGELES (PREPARED FOR NRC)
NUREG-0148 + UCLA-ENG-76116 +. 144 PPS. JAN. 1977

THE RELIABILITY PROGRAM WHICH WAS ESTABLISHED FOR THE CLINCH RIVER FAST BREEDER REACTOR PROJECT IS REVIEWED. THE REVIEW REVEALS SEVERAL PROBLEMS AND UNCERTAINTIES WHICH NEED TO BE APPROPRIATELY ADDRESSED BY THE RELIABILITY PROGRAM. THE MAIN PROBLEMS ARE STATED TO BE THE CHOICE OF THE RELIABILITY CRITERION, THE PROSPECTS OF ATTAINING HIGH RELIABILITIES OF SYSTEMS AND CRITICAL STRUCTURES, THE ROLE OF EXTERNAL PHENOMENA AS WELL AS THE VERIFICATION BY TESTS AND THE RELIABILITY ASSURANCE PROGRAM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + RELIABILITY ANALYSIS + REACTOR, LMFBR + CLINCH RIVER (LMFBR) + REVIEW + *DESIGN CRITERIA + *QUALITY ASSURANCE

122621
FISSION, BREEDER, REPROCESSING AND 'HAVE-NOTS'--ROSE OF MIT
1 PG. NUCLEAR INDUSTRY, 24(3), PG. 25 (MARCH 1977)

IN A PHILOSOPHICAL ADDRESS THAT RANGED FROM THE GOSPEL ACCORDING TO ST. LUKE TO THE WISDOM OF DEREGULATING NATURAL GAS PRICES, PROF. DAVID ROSE OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY CONCLUDED THAT NUCLEAR FISSION PLUS THE BREEDER PLUS FUEL REPROCESSING IS--BY A PROCESS OF ELIMINATION--THE WORLD'S ONLY LONG-TERM ENERGY ANSWER, AND ALSO THAT ADVANCED NATIONS MUST HONOR THEIR MORAL IMPERATIVE TO PROVIDE FOR THE ENERGY NEEDS OF THE DEVELOPING WORLD AS WELL AS THEIR OWN.

REACTOR, BREEDER + FUEL REPROCESSING + POWER PLANT, NUCLEAR + SOLAR + FUSION

122625
BREEDER REACTOR CALLED 'BARGAIN'
1 PG. THE ROANE COUNTY (TENN.) NEWS, PG. 3-A, APRIL 14, 1977

'THE BREEDER REACTOR IS THE BEST BARGAIN FOR THE UNITED STATES SINCE THE LOUISIANA PURCHASE,' SAID FORMER AEC COMMISSIONER CLARENCE LARSON. WITH THE PURCHASE THE FRENCH LOST THEIR POSITION OF POWER AND INFLUENCE IN THE UNITED STATES, HE SAID. 'IT IS A SAD FACT THAT 175 YEARS LATER A POSSIBLE DECISION IN THIS COUNTRY TO FOREGO THE BREEDER COULD GIVE PRE-EMINENCE IN THE BREEDER FIELD TO THE FRENCH.' DR. LARSON SAID THAT HE FIRST URGED IN A SPEECH IN 1953 THAT THE NATION

122625 *CONTINUED*
STOP USING OIL AND NATURAL GAS FOR FUEL BECAUSE THESE FUELS WERE TOO SCARCE AND VALUABLE.

REACTOR, BREEDER + FRANCE + ENERGY + CONSERVATION + CLINCH RIVER (LMFBR)

123230
COTTRELL AH
NUCLEAR POWER AND THE PUBLIC INTEREST (EXTRACTED)
THE MASTER JESUS COLLEGE, CAMBRIDGE
2 PPS, ENERGY DIGEST, 5(5), PP. 4-5 (OCT. 1976)

THE AUTHOR BELIEVES THAT, AT ABOUT THE TURN OF THE CENTURY, ENGLAND WILL ENTER A PERIOD OF GRAVE ENERGY CRISIS UNLESS THEY DEVELOP ALL THE MAJOR ENERGY OPTIONS - FOSSIL FUELS, NUCLEAR, CONSERVATION, AND SOME RENEWABLE ENERGY SOURCES. ENGLAND HAS ENOUGH COAL RESERVES TO LAST THROUGH THE NEXT CENTURY, BUT THEY MUST START NOW TO INCREASE PRODUCTION. NUCLEAR CAPACITY IN THE YEAR 2000 SHOULD BE ABOUT FOUR TIMES LARGER THAN IT IS TODAY. ALSO, A STRENUOUS EFFORT FOR CONSERVATION WILL BE REQUIRED. THE FUTURE ROLE OF NUCLEAR POWER MUST DEPEND ON THE FAST BREEDER REACTOR. WITHOUT THE FBR CONTRIBUTION, URANIUM SUPPLIES WILL BE INSUFFICIENT. WITH THE FBR, FUEL SUPPLY LIMIT BECOMES LESS.

UNITED KINGDOM + ENERGY + FORECAST + FUEL, FOSSIL + COAL + POWER PLANT, NUCLEAR + REACTOR, BREEDER

123381
PEARLSTEIN L
PROLIFERATION WORRY THREATENS TOTAL NUCLEAR OPTION
2 PPS, THE OAK RIDGER (TENN.), APRIL 12, 1977

REPORTS ON THE COMMITTEE APPOINTED BY PRESIDENT CARTER TO STUDY THE NEED FOR THE LMFBR. HE WARNED THAT CONCERN FOR PROLIFERATION WOULD ALMOST FOR CERTAIN DELAY OR CAUSE CANCELLATION OF BREEDER DEVELOPMENT AND COULD POSSIBLY CAUSE THE ENTIRE NUCLEAR OPTION TO BE HALTED. BY USING CHARTS AND GRAPHS ON URANIUM SUPPLIES AND ESTIMATED ENERGY NEEDS, HE SHOWED HOW BREEDER DEVELOPMENT COULD NOT BE DELAYED FOR VERY LONG WITHOUT CAUSING SERIOUS ENERGY SHORTAGES BY THE YEAR 2000. CULLER SAID OF THE 10 PEOPLE WHO SERVED ON THE COMMITTEE, 6 WERE PRO-BREEDER AND 4 WERE NOT. THREE REPORTS WERE ISSUED - ONE FOR THE PRO GROUP, ONE FOR THE OPPONENT GROUP, AND ONE REPORT ON ITEMS OF TOTAL AGREEMENT.

REACTOR, BREEDER + CLINCH RIVER (LMFBR) + OPPONENT + PROPONENT + ENERGY + PROLIFERATION + INDUSTRY, NUCLEAR

123704
YASINSKY JB
THE BREEDER STORY
WESTINGHOUSE ELECTRIC CORP.
17 PPS, PRESENTED AT WORKSHOP ON "NUCLEAR INFORMATION STRATEGIES: NEW SETTINGS, NEW APPROACHES", LAS VEGAS, NEV., SEPT. 28, 1976

DISCUSSES THE BREEDER R AND D PROGRAM, FUNDING, RESEARCH, ATTITUDES OF GOVERNMENT OFFICIALS, AND SCHEDULES. THE PROJECT HAS THREE GOALS, COMPLETION OF THE FFTF EXPERIMENTAL REACTOR, THE CLINCH RIVER DEMONSTRATION PLANT, AND THE PROTOTYPE LARGE BREEDER REACTOR.

AVAILABILITY - ATOMIC INDUSTRIAL FORUM INC., PUBLIC AFFAIRS & INFORMATION PROGRAM, 475 PARK AVENUE SOUTH, NEW YORK, N.Y. 10016

REACTOR, LMFBR + FFTF (TR) + CLINCH RIVER (LMFBR) + ECONOMICS + R AND D PROGRAM

124320
BUNDY M + KEENY SM + ABRAHAMSON S + KAYSEN C
NUCLEAR POWER ISSUES AND CHOICES
THE MITRE CORP.
418 PPS, PUBL. BY BALLING PUBLISHING CO., CAMBRIDGE, MASS., SPONSORED BY THE FORD FOUNDATION, 1977

PRESENTS THE RESULTS OF A YEAR LONG STUDY OF THE DEBATE OVER NUCLEAR POWER ISSUES SPONSORED BY THE FORD FOUNDATION GRANT TO THE MITRE CORP. MITRE PROVIDED ADMINISTRATIVE SUPPORT TO THE 21 MEMBERS OF THE PANEL, THE NUCLEAR ENERGY POLICY STUDY GROUP, WHO WERE ASSEMBLED TO PERFORM THE STUDY. THE GROUP SOUGHT TO DEVELOP A FRAMEWORK FOR ASSESSING THE DIFFICULT PROBLEMS RELATING TO NUCLEAR POWER NOW BEFORE THE U.S. GOVT. ISSUES CONSIDERED WERE: THE REPROCESSING AND RECYCLE OF PLUTONIUM; THE BREEDER REACTOR PROGRAM; THE MANAGEMENT OF NUCLEAR WASTES; THE EXPANSION OF URANIUM ENRICHMENT CAPACITY; AND THE EXPORT OF NUCLEAR TECHNOLOGY AND MATERIALS. MAJOR SECTIONS OF THE BOOK ARE ENTITLED: ENERGY ECONOMICS AND SUPPLY; HEALTH, ENVIRONMENT, AND SAFETY; NUCLEAR PROLIFERATION AND TERRORISM; AND ISSUES FOR DECISION.

*N-POWER, SAFETY OF + SAFETY PRINCIPLES AND PHILOSOPHY + FUEL RECYCLE + FUEL REPROCESSING + WASTE MANAGEMENT + EXPANSION + ENRICHMENT FACILITY + ECONOMICS + ENVIRONMENTAL QUALITY + PROLIFERATION + SABOTAGE + SAFEGUARDS, NUCLEAR MATERIAL + *N-POWER FORECAST + REACTOR, BREEDER + ATMOSPHERIC DIFFUSION + PLUTONIUM

124481
SUITA T + OYAMA A
PROGRAMME AND CURRENT STATUS OF FAST BREEDER REACTOR DEVELOPMENT IN JAPAN

124491 *CONTINUED*
ATOMIC ENERGY COMMISSION + POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORP., TOKYO, JAPAN
IAEA-CN-36/164 +. 20 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

FAST BREEDER REACTOR DEVELOPMENT IN JAPAN HAS BEEN CARRIED OUT AS A NATIONAL PROJECT. THE EXPERIMENTAL FAST REACTOR, "JOYO" HAS 50 MW THERMAL AS THE INITIAL OUTPUT AND WOULD BE CRITICAL IN 1977. EVENTUALLY ITS OUTPUT WILL BE INCREASED TO 100 MW. THE PROTOTYPE FAST BREEDER REACTOR, "MONJU" OF 300 MW ELECTRICITY HAS ALMOST BEEN COMPLETED IN ITS CONCEPTUAL DESIGN AND THE MONITORING AND SURVEY HAVE STARTED AT THE PROPOSED SITE. THE ATOMIC ENERGY COMMISSION OF JAPAN HAS RECENTLY RECONFIRMED THE HIGHEST PRIORITY FOR FAST BREEDER REACTOR DEVELOPMENT. THUS THE FAST BREEDER REACTOR WOULD PLAY A MAJOR ROLE SOLVING THE ENERGY PROBLEM IN JAPAN.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

REACTOR, POWER + FUEL CYCLE + JAPAN + *R AND D PROGRAM + *REACTOR, FAST + *REACTOR, BREEDER + ENERGY

124494
BESSE G + ROZENHOLE M + SAITEEVSKY B + VENURYES G
STATUS AND PROSPECTS OF THE FRENCH FAST BREEDER REACTOR PROGRAMME
COGEMA + NOVATOME + NERSA + CEA
IAEA-CN-36/219 +. 14 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

REVIEWS IN SUCCESSION THE MAIN PHASES OF THE FRENCH FAST BREEDER REACTOR PROGRAMME, WHILE STRESSING THE RESULTS ACHIEVED, THE PROBLEMS ENCOUNTERED, AND PLANNED DEVELOPMENTS. REMAINS ON A TECHNICAL LEVEL, WITH BRIEF ALLUSIONS TO ECONOMIC ASPECTS, INDUSTRIAL ORGANIZATION, AND INTERNATIONAL COOPERATIVE AGREEMENTS.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

REACTOR, POWER + FUEL CYCLE + FRANCE + REACTOR, FAST + REACTOR, BREEDER + *OPERATING EXPERIENCE + PHENIX (LMFBR) + SUPERPHENIX (LMFBR) + *REACTOR, LMFBR + REACTOR DESCRIPTION + RAPSODIE (LMCR)

124538
KAZACHKOVSKI OD + MESHKOV AG + MITENKOV FM + VASILENKO KT
THE USSR FAST REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT STATE
USSR
IAEA-CN-36/356 +. 24 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE, SALZBURG, AUSTRIA, MAY 2-13, 1977

THE USSR FAST REACTOR DEVELOPMENT PROGRAM IS AIMED AT CREATION OF RELIABLE AND COMPETITIVE FAST POWER REACTORS WHICH IN FUTURE WILL BE CAPABLE, TOGETHER WITH THERMAL REACTORS, TO PROVIDE THE MOST EFFICIENT UTILIZATION OF EXISTING NATURAL RESOURCES OF NUCLEAR RAW MATERIALS. THE PROGRAM INCLUDES: CONSTRUCTION OF FIRST POWER REACTORS TO GAIN EXPERIENCE IN DESIGNING, CONSTRUCTION AND OPERATION; FURTHER DEVELOPMENT AND ADVANCEMENT OF REACTOR EQUIPMENT, IMPROVEMENT OF ITS RELIABILITY AND INCREASE OF ITS SIZE; INVESTIGATION OF FUEL AND STRUCTURAL MATERIALS; IMPROVEMENT OF FUEL CYCLE; SAFETY STUDIES.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

REACTOR, POWER + USSR + *R AND D PROGRAM + *REACTOR, FAST + CONSTRUCTION + OPERATION + EQUIPMENT DEVELOPMENT + FUEL CYCLE + REACTOR, LMFBR + OPERATING EXPERIENCE

124565
VAUGHAN RD + CHERNANNE J
THE NEED FOR HIGH PERFORMANCE BREEDER REACTORS
EUROPEAN ASSOCIATION FOR THE GAS COOLED BREEDER REACTOR, BRUSSELS, BELGIUM
IAEA-CN-36/478 +. 8 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

THE RATE OF INSTALLATION OF BREEDER REACTORS, QUITE APART FROM THE DEVELOPMENT PROBLEMS WILL DEPEND UPON SEVERAL THINGS: (1) THE AMOUNT OF PU AVAILABLE FROM THERMAL REACTORS; (2) THE INCENTIVE AND POSSIBILITY TO START WITH U235; (3) THE QUANTITIES REQUIRED FOR THE FIRST CORES OF THE BREEDERS; (4) THE PU PRODUCED BY THE FAST REACTORS, I.E., BREEDING GAIN; AND (5) THE PU HELD UP OR LOST TO RESIDUES IN THE FUEL REPROCESSING CYCLE.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*REACTOR, BREEDER + PERFORMANCE + *N-POWER FORECAST + ENERGY SOURCE + REACTOR, GCFR

124601
DENISE RP + SPEIS TP + KELBER CN + CURTIS RT
LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS
U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON
IAEA-CN-36/576 +. 8 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

THE LICENSING APPROACH WHICH ENSURES ADEQUATE PROTECTION OF THE PUBLIC HEALTH AND SAFETY AGAINST

124601 *CONTINUED*

SERIOUS ACCIDENTS IS DESCRIBED. THIS PAPER DESCRIBES THE ROLE OF CORE MELT AND CORE DISRUPTIVE ACCIDENTS IN THE DESIGN, SAFETY RESEARCH, AND LICENSING PROCESSES, USING THE CLINCH RIVER BREEDER REACTOR AS A FOCAL POINT. MAJOR DESIGN ATTENTION IS PLACED ON THE PREVENTION OF THESE ACCIDENTS SO THAT THE PROBABILITY OF CORE MELT ACCIDENTS IS REDUCED TO A SUFFICIENTLY LOW LEVEL THAT THEY ARE NOT TREATED AS DESIGN BASIS ACCIDENTS. ADDITIONAL REQUIREMENTS ARE PLACED UPON THE DESIGN TO FURTHER REDUCE RESIDUAL RISK.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, NY 10016

REACTOR, LMFBR + ACCIDENT ANALYSIS + LICENSING PROCESS + ACCIDENT, CORE DISRUPTIVE + CORE MELTDOWN + *CLINCH RIVER (LMFBR) + *SAFETY ANALYSIS

124692
WENT JJ
STATUS AND PROSPECTS OF THERMAL BREEDERS
CENTRAL ORGANIZATION OF THE NETHERLANDS, ELECTRICITY SUPPLY UNDERTAKINGS
IAEA-NL-302 +, 15 PPS, FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

SIGNIFICANT CHANGES HAVE OCCURRED IN THE PAST FEW YEARS IN THE PROJECTIONS FOR THE WORLDWIDE IMPLEMENTATION OF NUCLEAR POWER AND OF DIFFERENT REACTOR SYSTEMS. TO CONSIDER IF THESE CHANGES HAVE INCREASED THE INCENTIVES FOR THERMAL BREEDER OR NEAR-BREEDER DEVELOPMENT TO IMPROVE NUCLEAR FUEL UTILIZATION IN THERMAL REACTORS, A GROUP OF EXPERTS REPRESENTING THE MAIN LINES OF THERMAL BREEDER REACTOR DEVELOPMENT WAS CONVENED BY THE INTERNATIONAL ATOMIC ENERGY AGENCY AT THE END OF 1975. IT WAS DECIDED TO PREPARE A REPORT ON THE STATUS AND PROSPECTS OF THERMAL BREEDERS FOR PUBLICATION BY THE IAEA. THIS PAPER PRESENTS THE PRELIMINARY REPORT.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*REACTOR, BREEDER + *REACTOR, THERMAL + REVIEW + CANDU (HWR) + REACTOR, MOLTEN SALT + THORIUM

126453
RUBEL P
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY
OAK RIDGE NTIONAL LAB., TENN.
ORNL/TM-5681 +, 35 PPS, 1 FIG, 29 REFS, MARCH 1977

HUMAN ENGINEERING SOURCE AND APPLICATIONS LITERATURE WAS REVIEWED TO OBTAIN GUIDANCE FOR FUTURE EFFORTS TO ENHANCE THE OPERABILITY AND MAINTAINABILITY OF THE CLINCH RIVER BREEDER REACTOR PLANT (CRBRP). SELECTED FINDINGS WERE INCORPORATED INTO RECOMMENDATIONS TO APPLY SPECIFIC HUMAN ENGINEERING METHODS AT APPROPRIATE STAGES OF THE CRBRP PROJECT. THIS STUDY ADDRESSES 2 MAIN OBJECTIVES: (1) REDUCED LIKELIHOOD OF OPERATING AND MAINTENANCE ERRORS IN ACTIVITIES ASSOCIATED WITH CRBRP OPERATION, AND (2) IMPROVED CONTROL FACILITIES AND PROCEDURES TO ENABLE OPERATORS TO COPE EFFECTIVELY WITH PLANT CONTIGENCY CONDITIONS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + CONTROL SYSTEM + OPERATOR ACTION + TRAINING + DESIGN STUDY + PROCEDURES AND MANUALS + MAINTENANCE AND REPAIR + OPERATION

126672
MANNAFORD J + FRYER DHM
SAFETY ISSUES IN LICENSING COMMERCIAL LMFBR'S
NUCLEAR INSTALLATIONS INSPECTORATE, LONDON, UK
CONF-761001(VOL. 1) +, 11 PPS, PP. 33-43 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS: CHICAGO, ILL., OCT. 5-8, 1976

THE PAPER DESCRIBES BRIEFLY THE ROLE OF THE NUCLEAR INSTALLATIONS INSPECTORATE OF THE HEALTH AND SAFETY EXECUTIVE AS THE INDEPENDENT LICENSING BODY WITHIN THE UNITED KINGDOM AND EXPLAINS THE PART THEY PLAY IN THE PRE-LICENSING PHASES OF COMMERCIAL FAST REACTORS. THE WHOLE CORE ACCIDENT (WCA) IS EXAMINED IN SOME DETAIL AND FROM THIS EXAMINATION THE MAJOR SAFETY ISSUES ARE HIGHLIGHTED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + *UNITED KINGDOM + *ACCIDENT ANALYSIS + ACCIDENT, CORE DISRUPTIVE + ACCIDENT, CONSEQUENCES + REACTOR, POWER + FUEL COOLANT INTERACTION + FLOW BLOCKAGE + CONTAINMENT INTEGRITY

126870
VENDRYES GA
SUPERPHENIX: A FULL SCALE BREEDER REACTOR
9 PPS, FIGS, SCIENTIFIC AMERICAN, 236(3), PP. 26-34 (MARCH 1977)

DISCUSSES THE DECISION BY A CONSORTIUM OF EUROPEAN ELECTRIC-UTILITY COMPANIES TO BUILD THE 1200 MW SUPER-PHENIX BREEDER AT CREYS-MALVILLE IN FRANCE. AFTER DISCUSSING THE NEED FOR BREEDER REACTORS AND THE NUCLEAR PHYSICS OF BREEDING, A DESCRIPTION OF THE SUPERPHENIX AND ITS PARAMETERS IS PRESENTED. A REVIEW OF THE OPERATING RECORD AND EXPERIENCE OF THE PHENIX REACTOR - A

126870 *CONTINUED*
DEMONSTRATION PLANT - IS PRESENTED. A SURVEY AND LISTING OF PROGRESS IN THE DEVELOPMENT OF LMFBR'S IN THE WORLD WITH A THERMAL OUTPUT GREATER THAN 1 MW IS GIVEN.

REACTOR, LMFBR + *REACTOR DESCRIPTION + REACTOR PHYSICS + PHENIX (LMFBR) + OPERATING EXPERIENCE SUMMARY + GROWTH/DEVELOPMENT + *SUPERPHENIX (LMFBR)

126907
COST OF 20-YEAR DELAY COULD BE $3.5 TRILLION
1 PG. NUCLEAR NEWS, 20(8), PG. 40 (JUNE 1977)

AN OFFICIAL OF EPRI TOLD A SENATE SUBCOMMITTEE THAT A 20-YEAR DEFERAL OF THE LIQUID METAL FAST BREEDER REACTOR COULD COST THE UNITED STATES FROM $105 BILLION TO $3.5 TRILLION OVER THE NEXT 75 YEARS. RENE H. MALES SAID THAT THE LATTER FIGURE "WOULD AMOUNT OT A 5.7 PERCENT AVERAGE ANNUAL REDUCTION IN GROSS NATIONAL PRODUCT BETWEEN NOW AND THE YEAR 2050." MALES ADDRESSED HIMSELF TO THE RECENT FORD FOUNDATION/MITRE STUDY WHICH SAID THAT DOMESTIC URANIUM SUPPLIES ARE ABUNDANT ENOUGH TO MAKE BREEDERS UNNECESSARY. MALES RESPONDED THAT "EVEN WITH ADEQUATE AVAILABILITY OF OTHER RESOURCES, THE COST OF A 20-YEAR DELAY IN BREEDER DEVELOPMENT WOULD BE $150 BILLION."

ECONOMICS + REACTOR, BREEDER + REACTOR, LMFBR

126908
STARR C
NUCLEAR POWER AND WEAPONS PROLIFERATION - THE THIN LINK
ELECTRIC POWER RESEARCH INST.
4 PPS, 2 TABS. NUCLEAR NEWS, 20(8), PP. 54-57 (JUNE 1977)

IT IS CERTAIN THAT NEITHER THE UNITED STATES NOR THE REST OF THE WORLD HAS THE CHOICE OF SEVERLY LIMITING NUCLEAR POWER, AND THAT THE REPROCESSING TECHNOLOGY AND BREEDER ISSUES HAVE ONLY A THIN AND CONTROLLABLE LINK TO PROLIFERATION. IT IS A DISSERVICE TO THE PEOPLE OF THE UNITED STATES--AND TO THE PEOPLE OF THE WORLD--TO CREATE THE ILLUSION THAT BY PUTTING RESTRICTIONS ON CIVILIAN NUCLEAR POWER WE HAVE SOMEHOW SOLVED THE PROLIFERATION PROBLEM. ONE MAY ASK WHO WOULD BENEFIT FROM SUCH A POLICY? THE OIL-EXPORTING NATIONS, OF COURSE, AND THOSE NATIONS THAT ARE CONTINUING TO DEVELOP ALL THEIR NUCLEAR POWER OPTIONS WITHOUT RESTRICTION. THE SAFEST PLACE FOR PLUTONIUM IS TO BURN IT IN A POWER REACTOR.

PROLIFERATION + REACTOR, BREEDER + FUEL CYCLE + FUEL, FOSSIL + PLUTONIUM + POWER PLANT, NUCLEAR

127515
CLINCH RIVER BREEDER REACTOR PLANT TECHNICAL REVIEW, SUMMER 1977
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TENN.
CRBRP-PNC-77-03 +, 45 PPS, 1977

CONTAINS ARTICLES ON THE FOLLOWING TOPICS: RADIATION PROTECTION/SHIELD DESIGN - A NEED FOR A SYSTEMS APPROACH, MEETING U.S. ELECTRICAL NEEDS - IS THE BREEDER URGENT?, IRRADIATION EFFECTS AND DESIGN OF LMFBR PERMANENT REACTOR STRUCTURES, AND DETECTION OF LIQUID METAL LEAKS IN LMFBRS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + *CLINCH RIVER (LMFBR) + *DESIGN CRITERIA + SHIELDING + SUPPORT STRUCTURE + RADIATION EFFECT + LEAK DETECTION + JACOBS

128413
ROTBLAT J
NUCLEAR REACTORS - TO BREED OR NOT TO BREED
123 PPS. A PUGWASH DEBATE ON FAST BREEDER REACTORS; ROYAL SOCIETY, LONDON, SEPT. 28, 1976. BOOK PUBLISHED BY TAYLOR & FRANCIS LTD., LONDON, 1977

A COMPENDIUM OF PAPERS PRESENTED AT THE PUGWASH DEBATE ON FAST BREEDER REACTORS HELD IN LONDON ON SEPT. 23, 1976. TOPICS COVERED INCLUDED THE FOLLOWING: NUCLEAR POWER AND THE ENVIRONMENT (THE FLOWER'S REPORT), THE ENERGY CASE FOR THE FAST BREEDER, THE SAFETY OF THE FAST BREEDER, PROCESSING AND REPROCESSING OF FUEL, RADIOACTIVE WASTE MANAGEMENT IN THE UK, DIVERSION OF PLUTONIUM, AND PROLIFERATION OF NUCLEAR WEAPONS.

REACTOR, LMFBR + *REACTOR, FAST + *N-POWER, SAFETY OF + UNITED KINGDOM + FUEL REPROCESSING + WASTE MANAGEMENT + PLUTONIUM + THEFT/DIVERSION + PROLIFERATION

128622
KAPLAN G
EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD
5 PPS. IEEE SPECTRUM, 13(12), PP. 37-41 (DEC. 1976)

BOTH FRANCE AND THE UNITED KINGDOM HAVE CONTINUED TO PLAY AN ACTIVE ROLE IN DEVELOPING NUCLEAR TECHNOLOGY. THIS ARTICLE SUMMARIZES THE PRESENT STATUS OF SEVERAL KEY ASPECTS OF NUCLEAR POWER IN THESE COUNTRIES: WHAT ARE THE PRESENT TARGETS OF THESE PROGRAMS, AND THE GUIDING POLICIES, IF ANY, FOR SELECTING THE TYPES OF REACTORS INVOLVED? WHAT IS THE STATUS OF ADVANCED FISSION TECHNOLOGY--NAMELY, OF BREEDER REACTORS? WHAT IS BEING DONE IN THE AREA OF DEVELOPING TECHNOLOGY

128622 *CONTINUED*
FOR THE SAFE DISPOSAL OF HIGHLY RADIOACTIVE NUCLEAR WASTES? WHAT PROGRESS HAS BEEN MADE TOWARD THE GENERATION OF ELECTRICITY BY NUCLEAR FUSION (THERMONUCLEAR) REACTIONS?

UNITED KINGDOM + FRANCE + POWER PLANT, NUCLEAR + R AND D PROGRAM + REACTOR, BREEDER + PHENIX (LMFBR)

128881
FLOWER POWER--WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN HELP ANYONE?
1 PG. ELECTRICAL REVIEW, 199(13), PG. 15 (OCT. 1, 1976)

THE FLOWERS REPORT ON "NUCLEAR POWER AND THE ENVIRONMENT," IS DISAPPOINTING IN THAT IT MIXES FACT AND OPINION; SOME EXPERT AND SOME NOT SO EXPERT. THE REPORT SAYS THAT OPERATION OF EXISTING THERMAL REACTORS AND THOSE THAT ARE BEING INSTALLED OR CONSIDERED ARE NOT AN UNACCEPTABLE HAZARD WHEN JUDGED AGAINST THE BENEFITS. THE COMMISSION IS OPPOSED TO THE NEXT STAGE OF FAST BREEDER REACTOR DEVELOPMENT BECAUSE IT IS SO EXPENSIVE AND COULD BRING IN THE "PLUTONIUM ECONOMY." A COUNTRY SITUATED AS BRITAIN CANNOT ESCAPE THE HAZARDS OF THE "PLUTONIUM ECONOMY" BY LONE ABSTENTION. HALTING THE DEVELOPMENT OF ATOMIC ENERGY WILL INCREASE THE RATE OF DEPLETION OF FOSSIL FUELS WHICH COULD LEAD TO A GREATER CATASTROPHE THAN ALL THE DIRE CONSEQUENCES PREDICTED BY THE ANTI-NUKES.

ENERGY + POWER PLANT, NUCLEAR + ECONOMICS + PLUTONIUM + REACTOR, FAST + REACTOR, BREEDER

129524
URANIUM INDUSTRY BALKS AT KICK FROM CARTER
2 PPS. ELECTRICAL REVIEW, 201(4), PP. 16-17 (JULY 22, 1977)

PRESIDENT CARTER'S POLICY WILL PREVENT REPROCESSING OF NUCLEAR FUEL IN THE U.S. AND DISCOURAGE IT ELSEWHERE. IF CARTER'S POLICY IS STRONGLY ENFORCED OVER FIVE TO TEN YEARS, THERE WILL BE TWO MAJOR CONSEQUENCES: THE DEVELOPMENT OF FAST BREEDER REACTORS WILL BE SLOWED DOWN AND USERS OF URANIUM AS FUEL WILL NOT BE ABLE TO EXTRACT THE MAXIMUM POSSIBLE ENERGY FROM EACH UNIT OF URANIUM SUPPLIED. THIS WILL TEND TO MAKE NUCLEAR ENERGY MORE EXPENSIVE. THE URANIUM PRODUCERS FEAR THAT THESE EXTRA COSTS WILL MAKE THE NUCLEAR OPTION EVEN LESS ATTRACTIVE THAN IT IS ALREADY.

URANIUM + INDUSTRY, NUCLEAR + RESOURCE, NATURAL + REACTOR, BREEDER

2. SITING OF NUCLEAR FACILITIES

126678
LEFEVRE JC + LIVOLANT M + LUCENET G
SEISMIC ANALYSIS FOR THE SUPER-PHENIX REACTOR
COMMISSARIAT A L'ENERGIE ATOMIQUE + ELECTRICITE DE FRANCE
CONF-761001(VOL. 1) +. 13 PPS. PP. 180-92 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

THE SEISMIC ANALYSIS PERFORMED FOR SUPER-PHENIX IS PRESENTED IN THIS PAPER. THE ANALYSIS CONSISTS ESSENTIALLY OF: SELECTING REFERENCE GROUND MOTIONS BASED ON THE SEISMIC RISKS AT THE SITE; ESTABLISHING GENERAL EARTHQUAKE SAFETY CRITERIA; STUDYING THE RESPONSE OF BUILDINGS, SYSTEMS AND COMPONENTS, USING THE MOST APPROPRIATE METHODS; AND ESTABLISHING DESIGN AND ACCEPTANCE CRITERIA IN ORDER TO VERIFY THE VALIDITY OF THE CONCEPTION AND THE RELIABILITY OF THE EQUIPMENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*SUPERPHENIX (LMFBR) + REACTOR, LMFBR + *SEISMIC DESIGN + SEISMOLOGY + EARTHQUAKE ENGINEERING + SAFETY ANALYSIS

127604
REDDY DP
SEISMIC SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, VOLUME I - ANALYSIS TECHNIQUES
AGBABIAN ASSOCIATES, EL SEGUNDO, CALIF.
SAN/1011-110 +. 152 PPS. 6 TABS. 38 FIGS. REFS. APRIL 16, 1976

THIS REPORT IS VOLUME I OF A THREE-VOLUME SERIES THAT PROVIDES GUIDELINES FOR PERFORMING DYNAMIC SEISMIC SOIL/STRUCTURE INTERACTION ANALYSES OF LMFBR FACILITIES. THIS VOLUME SUMMARIZES THE REQUIREMENTS FOR DYNAMIC SEISMIC ANALYSES. BASIC STATE-OF-THE-ART MATHEMATICAL MODELING PROCEDURES ARE DISCUSSED, AND THE FUNDAMENTAL MATHEMATICAL AND MECHANICS RELATIONSHIPS USED IN MAKING DYNAMIC ANALYSES WITH MODERN LARGE CAPACITY COMPUTER PROGRAMS ARE SUMMARIZED. PROCEDURES FOR OBTAINING MASS, STIFFNESS, AND DAMPING MATRICES THAT APPEAR IN THE BASIC EQUATIONS OF MOTION ARE REVIEWED AND SOLUTION METHODS BY MODAL ANALYSIS, DIRECT INTEGRATION, FOURIER TRANSORMS, AND FOSS' METHOD ARE DISCUSSED. A SUMMARY OF THE BASIC CONCEPTS USED IN FINITE ELEMENT SOLUTIONS BY THE DISPLACEMENT METHOD IS PROVIDED, AND THE TYPES OF ELEMENTS AVAILABLE, MATERIAL REPRESENTATIONS, AND THE TECHNIQUES OF PROVIDING ENERGY ABSORBING BOUNDARIES ARE DESCRIBED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

INTERACTION, SOIL AND STRUCTURE + REACTOR, LMFBR + SEISMIC DESIGN + *STRUCTURAL ANALYSIS, DYNAMIC + JACOBS

3. TRANSPORTATION AND HANDLING OF RADIOACTIVE MATERIALS

124041
FIELDS SR
SPENT FUEL SHIPPING CASK ACCIDENT EVALUATION
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 75-138 +. 382 PPS. DEC. 1975

MATHEMATICAL MODELS HAVE BEEN DEVELOPED TO SIMULATE THE DYNAMIC BEHAVIOR, FOLLOWING A HYPOTHETICAL ACCIDENT AND FIRE, OF TYPICAL CASKS DESIGNED FOR THE RAIL SHIPMENT OF SPENT FUEL FROM NUCLEAR REACTORS, AND TO DETERMINE THE EXTENT OF RADIOACTIVE RELEASES UNDER POSTULATED CONDITIONS. THE CASKS MODELED WERE THE IF-300, DESIGNED BY GENERAL ELECTRIC FOR THE SHIPMENT OF SPENT LWR FUEL, AND A CASK DESIGNED BY THE AEROJET MANUFACTURING COMPANY FOR THE SHIPMENT OF SPENT LMFBR FUEL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + *ANALYTICAL MODEL + *SHIPPING CONTAINER + ACCIDENT ANALYSIS + FIRE PROTECTION + RADIOACTIVITY RELEASE + FUEL, NUCLEAR + REACTOR, LWR + REACTOR, LMFBR + TRANSPORTATION AND HANDLING + *ACCIDENT, TRANSPORTATION + TRAIN

127612
DUPREE SA + SCHMIDT WH
LMFBR SPENT-FUEL CHARACTERIZATION FOR SHIPPING-CASK APPLICATION
SANDIA LABS., ALBUQUERQUE, N.M.
SAND-76-0602 +. 75 PPS, 20 TABS, 16 FIGS, 18 REFS, MAY 1977

THE RESULTS PRESENTED IN THIS REPORT DO NOT CONSTITUTE A COMPLETE DATA BASE FOR LMFBR SPENT-FUEL SHIPPING-CASK DESIGN. A REASONABLE SELECTION OF REACTOR DESIGNS HAS BEEN EXAMINED, HOWEVER, AND DECAY SOURCES HAVE BEEN CALCULATED BY USING ONE OF THE MAJOR GENERALLY AVAILABLE CALCULATIONAL TOOLS FOR ANALYZING REACTOR SPENT FUEL. THE COMPARISONS MADE WITH OTHER DATA INDICATE THAT THE RESULTS ARE CONSISTENT WITH OTHER PREDICTIONS FOR THE SAME OR SIMILAR REACTOR FUEL. THEREFORE, USE OF THESE DATA AS PRELIMINARY GUIDELINES FOR CASK ANALYSES WOULD SEEM TO BE JUSTIFIED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

TRANSPORTATION AND HANDLING + *REACTOR, LMFBR + COMPUTER PROGRAM + *SHIPPING CONTAINER + *DESIGN CRITERIA + DECAY HEAT + JACOBS

5. HEAT TRANSFER AND THERMAL HYDRAULICS

120341
WILHELM D
CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED FAST BREEDER REACTORS WITH DIGITAL COMPUTER CODES (IN GERMAN)
KERNFORSCHUNGSZENTRUM KARLSRUHE, F.R. GERMANY
KFK-2299 +, 93 PPS, 34 FIGS, JUNE 1976

TWO COMPUTER CODES, PHAETON 1 AND PHAETON 2 ARE USED TO CALCULATE DEPRESSURIZATION AND FLOW COASTDOWN IN TWO HELIUM COOLED FAST BREEDER REACTORS. ONE OF THE REACTORS HAS DIRECT COOLING LOOPS WITH HELIUM TURBINES, THE OTHER SECONDARY STEAM LOOPS ATTACHED TO THE PRIMARY LOOPS. THE FIRST PART OF THE REPORT DESCRIBES MODELS, CORRELATIONS AND METHODS OF BOTH CODES, WHILE THE SECOND PART DISCUSSES THE RESULTS OF TRANSIENT ANALYSES.

AVAILABILITY - INIS SECTION, INTERNATIONAL ATOMIC ENERGY AGENCY, P.O. BOX 590, A-1011 VIENNA, AUSTRIA

*REACTOR, GCFR + REACTOR, BREEDER + COMPUTER PROGRAM + COMPUTER PROGRAM, DIGITAL + *ACCIDENT, LOSS OF PRESSURE + ACCIDENT, LOSS OF FLOW + TRANSIENT + PRESSURE TRANSIENT + TEMPERATURE GRADIENT

120349
FOUST OJ
SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM GENERATORS
LIQUID METAL ENGINEERING CENTER, CALIF.
390 PPS, BOOK PUBLISHED BY GORDON & BREACH SCIENCE PUBLISHERS INC., N.Y., 1976

THIS HANDBOOK, COMPRISED OF FIVE VOLUMES, IS INTENDED FOR USE BY PRESENT AND FUTURE DESIGNERS IN THE LMFBR PROGRAM AND BY THE ENGINEERING AND SCIENTIFIC EXCHANGERS, AND STEAM GENERATORS HIGH-TEMPERATURE SODIUM AND NAK TECHNOLOGY. THE ARRANGEMENT OF SUBJECT MATTER PROGRESSES FROM A TECHNOLOGICAL DISCUSSION OF SODIUM AND SODIUM-POTASSIUM ALLOY (NAK) TO DISCUSSIONS OF VARIOUS CATEGORIES AND USES OF HARDWARE IN SODIUM AND NAK SYSTEMS. EMPHASIS IS PLACED ON SODIUM AND NAK AS HEAT-TRANSPORT MEDIA; OTHER APPLICATIONS OF THESE METALS ARE TREATED IN THE FINAL VOLUME. SEVERAL THOUSAND DOCUMENTS WERE REVIEWED IN ACCUMULATING AND COMPILING INFORMATION; THOSE BELIEVED TO BE MOST VALUABLE ARE CITED AS REFERENCES. SUFFICIENT DETAIL IS INCLUDED FOR BASIC UNDERSTANDING OF SODIUM AAND NAK TECHNOLOGY AND OF TECHNICAL ASPECTS OF SODIUM AND NAK COMPONENTS AND INSTRUMENT SYSTEMS. THE 4 MAJOR CHAPTERS OF THIS VOLUME DISCUSS FLUID MECHANICS OF LIQUID METALS, LIQUID METAL HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM GENERATORS

*REACTOR, LMFBR + SODIUM + *NAK + *DATA COLLECTION + DESIGN CRITERIA + HEAT TRANSFER + INSTRUMENT, FLUIDICS + *METAL, LIQUID + HEAT EXCHANGERS + STEAM GENERATOR

120963
BAKER L + GABOR JD + SOWA ES + CHASANOV MG
POSTACCIDENT HEAT REMOVAL TECHNOLOGY
ARGONNE NATIONAL LAB., ILL.
ANL/RAS 77-2 +, 198 PPS, JAN. 1977

THIS IS THE FIFTH IN A SERIES OF REPORTS SUMMARIZING THE POSTACCIDENT HEAT REMOVAL (PAHR) PROGRAM AT ARGONNE, WHICH CONCERNS THE BEHAVIOR OF THE HEAT-GENERATING CORE DEBRIS FOLLOWING HYPOTHETICAL CORE-DISRUPTIVE ACCIDENTS (HCDA) FOR BOTH LIQUID METAL FAST BREEDER REACTORS (LMFBRS) AND GAS-COOLED FAST BREEDER REACTORS (GCFRS). THE ANL PAHR PROGRAM HAS THREE PARTS: ANALYSES AND PHENOMENOLOGICAL MODELING, OUT-OF-PILE EXPERIMENTS WITH REALISTIC MATERIALS, AND BASIC EXPERIMENTS WITH SIMULANT MATERIALS TO TAKE ADVANTAGE OF EXPERIMENTAL SIMPLICITY AND ECONOMY SO AS TO DEVELOP A FUNDAMENTAL UNDERSTANDING OF KEY PROCESSES.

REACTOR, LMFBR + REACTOR, GCFR + ACCIDENT, CORE DISRUPTIVE + OUT OF PILE EXPERIMENT + FLOW BLOCKAGE + FUEL MELTDOWN + CONCRETE + ANL + JACOBS

121327
RELIABILITY PROGRAM FOR SHUTDOWN HEAT REMOVAL
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEAP-14045-5 +, 21 PPS, 8 TABS, 9 REFS, JUNE 1976

THE FIFTH QUARTERLY REPORT DESCRIBES LMFBR SHUTDOWN HEAT REMOVAL SYSTEMS RELIABILITY ACTIVITIES FOR THE PERIOD BEGINNING IN MARCH 1976, AND ENDING IN MAY 1976. ACTIVITIES REPORTED INCLUDE COMPLETION OF COMMON CAUSE FAILURE ANALYSIS FOR CLINCH RIVER BREEDER REACTOR PLANT SHUTDOWN HEAT REMOVAL SYSTEMS, AND COMPLETION OF THE RELIABILITY ALLOCATION AND APPORTIONMENT FOR LMFBR SHUTDOWN HEAT REMOVAL SYSTEMS. IN ADDITION, A SUPPLEMENT TO THE PRIMARY PIPE INTEGRITY STATUS REPORT FOR CRBRP WAS PREPARED DURING THIS REPORT PERIOD.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*RELIABILITY, SYSTEM + REACTOR, LMFBR + CLINCH RIVER (LMFBR) + *SHUTDOWN COOLING SYSTEM + FAILURE, COMMON MODE + JACOBS + RELIABILITY ANALYSIS

121735
HORN HE
MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE GAMMA FIELD IN A FAST REACTOR
KARLSRUHE NUCLEAR RESEARCH CENTER, F.R. GERMANY

121735 *CONTINUED*
EURFNR-1316 +. 45 PPS. 2 TABS. NOV. 1975 (TRANSLATION OF KFK-2211)

SI (LI) SEMICONDUCTOR DETECTORS WERE USED TO MEASURE THE ENERGY DISTRIBUTION OF THE GAMMA FIELD IN THE KARLSRUHE FAST ZERO-POWER FACILITY SNEAK WITH THE HELP OF COMPTON ELECTRON SPECTRUM REGISTERED WITH THE DETECTORS. THE METHOD WAS CHECKED BY COMPARING MEASURED GAMMA-ATTENUATION COEFFICIENTS OF DIFFERENT MATERIALS WITH THE VALUES KNOWN FROM LITERATURE. THE SPECTRA OF TWO ASSEMBLIES (ONE WITH URANIUM, THE OTHER WITH PLUTONIUM FUEL) WITH COMPOSITIONS SIMILAR TO FAST SODIUM COOLED BREEDER REACTORS WERE MEASURED IN THE CORE AND IN THE BLANKET. IN ADDITION THE GAMMA-SPECTRUM IN A LITHIUM SPHERE INDUCED BY 14 MEV NEUTRONS WAS DETERMINED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

SPECTROMETRY, GAMMA + ANALYTICAL TECHNIQUE + JACOBS + REACTOR, BREEDER + REACTOR, LMFBR + SODIUM + URANIUM + PLUTONIUM + LITHIUM

122103
CASTLE J + CATTON, I. + SOMERTON C + WU R
LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976
UNIVERSITY OF CALIFORNIA, LOS ANGELES (PREPARED FOR NRC)
NUREG-0147 + UCLA-ENG-76115 +. 81 PPS. 7 TABS. 15 FIGS. JAN. 1977

THE SUBJECT OF THIS REPORT DEALS WITH THE BEHAVIOR OF MOLTEN CORE DEBRIS FOLLOWING A HYPOTHETICAL CORE DISRUPTIVE ACCIDENT IN THE PROPOSED CRBRP. HEAT DISSIPATING CHARACTERISTICS OF AN EX-VESSEL SACRIFICIAL BED HAVE BEEN ANALYZED. A NOVEL FORM OF HEAT TRANSFER, ANALAGOUS TO FILM BOILING, HAS BEEN PROPOSED TO DESCRIBE HEAT TRANSFER FROM A HEAT GENERATING POOL TO SURROUNDING STEEL WALLS. BOUNDING TYPE HEAT TRANSFER CALCULATIONS ARE ALSO MADE TO QUANTIFY SUCH HYPOTHETICAL ACCIDENT CHARACTERISTICS AS DEBRIS BED REMELTING, DEBRIS BED DRYOUT IN SODIUM AND FAILURE OF THE REACTOR CAVITY STEEL LINER.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + BEHAVIOR + MOLTEN FUEL + *CORE MELTDOWN + *ACCIDENT, CORE DISRUPTIVE + HEAT TRANSFER + *THERMODYNAMICS + THERMAL ANALYSIS + CLINCH RIVER (LMFBR) + HEAT TRANSFER ANALYSIS

122799
LORENZ JJ + GINSBERG T
COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL ASSEMBLY
ARGONNE NATIONAL LAB., ILLINOIS + BROOKHAVEN NATIONAL LAB., UPTON, N.Y.
12 PPS. 13 FIGS. 10 REFS. NUCLEAR ENGINEERING & DESIGN, 40(2), PP. 315-26 (FEB. 1977)

EXPERIMENTAL MIXING STUDIES WERE CONDUCTED USING WATER WITH A 91-PIN WIRE-WRAPPED FUEL ASSEMBLY TO ESTABLISH A DATA BASE FOR CALIBRATING THERMAL-HYDRAULIC CODES AND TO SUPPLEMENT AND CLARIFY EXISTING MIXING DATA. AN ELECTROLYTIC TRACER WAS EMPLOYED IN CONJUNCTION WITH AN ISOKINETIC SAMPLING TECHNIQUE WHICH PERMITTED MIXED MEAN SUBCHANNEL CONCENTRATIONS AND FLOWRATES TO BE MEASURED WITHOUT INCURRING ERRORS RESULTING FROM LOCAL SUBCHANNEL GRADIENTS. EMPHASIS WAS PLACED UPON THE BEHAVIOR OF PERIPHERAL SUBCHANNELS. A COMPLETE SET OF MIXING DATA WAS OBTAINED WHICH CAN BE USED TO CALIBRATE THERMAL-HYDRAULIC CODES.

REACTOR, LMFBR + OUT OF PILE EXPERIMENT + FLOW THEORY AND EXPERIMENTS + SUBCHANNEL ANALYSIS + COMPUTER PROGRAM, DIGITAL + COMPARISON, THEORY AND EXPERIENCE + ANL + FLOW DISTRIBUTION + FLOW, CROSS

122810
FISCHER AK + LO RK + BARTS EW
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)
ARGONNE NATIONAL LAB., ILLINOIS
ANL-76-79 +. 90 PPS. 10 TABS. 89 FIGS. JUNE 1976

THE BEHAVIOR OF FTR-TYPE, MIXED-OXIDE, PREIRRADIATED, 'INTERMEDIATE-POWER-STRUCTURE' FUEL DURING A SIMULATION OF AN FTR LOSS-OF-FLOW ACCIDENT WAS STUDIED IN THE MARK-IIA INTEGRAL TREAT LOOP. ANALYSIS OF THE DATA REPORTED HERE LEADS TO A POSTULATED SCENARIO (SEQUENCE AND TIMING) OF EVENTS IN THE TEST. THIS SCENARIO IS PRESENTED, TOGETHER WITH THE CALCULATED TIMING OF EVENTS OBTAINED BY USE OF THE SAS CODE.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + IN PILE EXPERIMENT + ACCIDENT, CORE DISRUPTIVE + ACCIDENT, LOSS OF FLOW + FUEL MELTDOWN + REACTOR, TEST + ANL + COMPUTER PROGRAM, DIGITAL + COMPARISON, THEORY AND EXPERIENCE + JACOBS

124281
GASSER RD + KAZIMI MS
A STUDY OF POST-ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR
BROOKHAVEN NATIONAL LAB., UPTON, N.Y.
12 PPS. 11 FIGS. 21 REFS. NUCLEAR TECHNOLOGY, 33(3), PP. 248-59 (MAY 1977)

A TWO-DIMENSIONAL TRANSIENT FREEZING MODEL IS DEVELOPED TO STUDY THE DYNAMICS OF SOLIDIFICATION OF A FLUID FLOWING IN A CYLINDRICAL CHANNEL, THE WALLS OF WHICH ARE COOLED BELOW THE FREEZING TEMPERATURE OF THE FLUID. THE MODEL IS APPLIED TO THE CASE OF MOLTEN FUEL FLOWING DOWNWARD

124281 *CONTINUED*
THROUGH THE COOLANT CHANNELS IN THE LOWER SHIELDING STRUCTURE OF CURRENT LIQUID-METAL FAST BREEDER REACTOR DESIGNS SUBSEQUENT TO A HYPOTHETICAL CORE MELTDOWN ACCIDENT. THE RESULTS INDICATE THAT UNDER POST-ACCIDENT CONDITIONS, A HIGH POTENTIAL EXISTS FOR RAPID RELOCATION OF SIGNIFICANT QUANTITIES OF CORE DEBRIS ACROSS THE SHIELD STRUCTURE.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + FUEL MELTDOWN + CORE MELTDOWN + ANALYTICAL MODEL + COMPARISON, THEORY AND EXPERIENCE

124787
LINZ DG + WANTLAND JL
TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR FUEL ASSEMBLIES
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5763 +, 43 PPS, 23 FIGS, 10 REFS, APRIL 1977

AN INVESTIGATION OF THE TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LIQUID-METAL FAST BREEDER REACTOR (LMFBR) FUEL ASSEMBLIES. THE TEST BUNDLES USED ARE ASSEMBLIES OF ELECTRIC FUEL PIN SIMULATORS HAVING THE SAME EXTERNAL CONFIGURATION, SPACER ARRANGEMENT, TEMPERATURE, AND HEAT FLUX AS TYPICAL LMFBR FUEL PINS. THE BUNDLES ARE CONTAINED IN A HEXAGONAL DUCT THAT IS INSTRUMENTED FOR TEMPERATURE MEASUREMENT AT SPECIFIC LOCATIONS. RESULTS SHOWED THAT THE SWIRL FLOW INDUCED BY THE WIRE-WRAP SPACERS IN THE DUCT PERIPHERY AND THE DISTANCE BETWEEN THE EDGE PINS AND THE DUCT WALL (WHICH CAN VARY DUE TO PIN BOWING) SIGNIFICANTLY INFLUENCED THE TEMPERATURE DISTRIBUTION IN THE DUCT WALL.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

REACTOR, LMFBR + THERMAL EXPERIMENT + HYDRAULIC EXPERIMENT + OUT OF PILE EXPERIMENT + FLOW, FIXING + SODIUM + ORNL + FLOW DISTRIBUTION + JACOBS + FLOW THEORY AND EXPERIMENTS

125258
KAZIMI MS + CARELLI MD
HEAT TRANSFER CORRELATION FOR ANALYSIS OF CRBRP ASSEMBLIES
WESTINGHOUSE ELECTRIC CORP., MADISON, PA.
CRBRP-ARD-0034 +, 21 PPS, NOV. 1976

AN INVESTIGATION WAS PERFORMED TO ASSESS THE ADEQUACY OF THE CORRELATIONS CURRENTLY USED TO DESCRIBE THE HEAT TRANSFER COEFFICIENT TO SODIUM FLOWING IN CRBRP ASSEMBLIES IN LIGHT OF THE EXPERIMENTAL DATA ACQUIRED AFTER 1969. THE AVAILABLE EXPERIMENTAL DATA FOR BUNDLES WITH P/D RATIOS OF 1.05 TO 1.3 AND THE RELEVANT HEAT TRANSFER CORRELATIONS ARE DESCRIBED. CORRELATIONS FOR CRBR FUEL, RADIAL BLANKET AND CONTROL ASSEMBLIES ARE RECOMMENDED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

HEAT TRANSFER COEFFICIENT + HEAT TRANSFER, CONVECTION + REACTOR, LMFBR + CLINCH RIVER (LMFBR) + CORRELATION + JACOBS

126688
WEBER DP + GANAPOL BD
MULTI-FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH SPACE-TIME KINETICS: FX2/VENUS-III
ARGONNE NATIONAL LAB., ILL.
CONF-761001(VOL.III) +, 9 PPS, PP. 1244-52 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

THE DEVELOPMENT OF COMPUTER CODES WHICH ANALYZE THE HYDRODYNAMICS, NEUTRONICS, AND THERMODYNAMICS OF HYPOTHETICAL LMFBR DISASSEMBLY STARTING WITH THE LAGRANGIAN 2-D HYDRODYNAMICS CODE VENUS AND EXTENDING TO THE EULERIAN HYDRODYNAMICS CODE FX2/VENUS-III RN WHICH INCLUDES TREATMENT OF MULTI-FIELD MOTIONS AS WELL AS SPACE-TIME KINETICS ARE REVIEWED. THE PHYSICAL ASSUMPTIONS THAT FORM THEIR BASIS ARE INDICATED AND THE DIFFERENCES IN SOLUTION TECHNIQUE ARE ILLUSTRATED. PRIMARY EMPHASIS IS GIVEN TO THE DESCRIPTION OF THE EULERIAN CODE DEVELOPMENT WITH INDICATIONS OF THE CAPABILITIES OF IMPLICIT DIFFERENCING, THE NECESSITY OF TRACKING GENERIC FUEL TYPES, THE EFFECT OF RELATIVE MOTION, AND THE ROLE OF SPACE-TIME KINETICS. SEVERAL EXAMPLES AND COMPARISONS OF CODES ARE GIVEN FOR FTR AND 1000 MW(E) DESIGNS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

HYDRODYNAMIC ANALYSIS + REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + ACCIDENT, HYPOTHETICAL

126864
SHIRE PR
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR SAFETY STUDIES
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-SA-1102-FP + CONF-761001-30 +, 17 PPS, FROM INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

A COMPUTER CODE HAS BEEN DEVELOPED TO MODEL THE EFFECTS OF POSTULATED SODIUM SPRAY RELEASE FROM LMFBR PIPING. THE CALCULATION METHOD UTILIZES GAS CONVECTION AND DROPLET COMBUSTION THEORY TO CALCULATE THE PRESSURE AND TEMPERATURE EFFECTS IN A RANGE OF 0-2% OXYGEN. DROPLET MOTION AND

126984 *CONTINUED*
LARGE AGGREGATE SODIUM SURFACE AREA RESULT IN RAPID RELEASE OF COMBUSTION AND SENSIBLE HEAT CAUSING A NEARLY ADIABATIC PRESSURE PULSE PEAKING IN A MATTER OF SECONDS. THIS ANALYTICAL TOOL HAS INDICATED GOOD AGREEMENT WITH PROTOTYPIC TEST DATA FOR A RANGE OF OXYGEN CONCENTRATION, CELL VOLUMES AND DROPLET SIZES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

ACCIDENT ANALYSIS + ACCIDENT MODEL + REACTOR, LMFBR + SODIUM + FIRE + FAILURE, PIPE + COMPUTER PROGRAM, DIGITAL + COMPARISON, THEORY AND EXPERIENCE

127684
COFFIELD RD + PLANCHON HP
LMFBR NATURAL CIRCULATION VERIFICATION PROGRAM (NCVP)
WESTINGHOUSE ELECTRIC CORP., MADISON, PA
WARD-NC-3065-1 +. 125 PPS. 9 TABS. 15 FIGS. JULY 1977

THE OBJECTIVE OF THE LMFBR NATURAL CIRCULATION VERIFICATION PROGRAM (NCVP) IS TO ANALYTICALLY AND EXPERIMENTALLY VERIFY NUMERICAL MODELS FOR THE DESCRIPTION OF THE THERMAL-HYDRAULIC BEHAVIOR OF LMFBR PLANTS WHEN MAKING TRANSITION OR TO OPERATING IN NATURAL CIRCULATION MODE. AFTER VARIOUS WORKING SESSIONS, IT HAS BEEN CONCLUDED BY ROD AND ARD THAT THE CODES TO BE VERIFIED BY THE NCVP WILL BE DEMO, FORE-2M, AND COBRA-IV (WHOLE CORE DYNAMIC VERSION). THE BASIS OF THIS SELECTION IS A STATE-OF-THE-ART REVIEW OF VARIOUS COMPUTER CODES. IT WAS CONCLUDED THAT NO CODE CURRENTLY AVAILABLE HAS ALL THE FEATURES NEEDED TO MEET THE PROGRAM OBJECTIVE.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

WESTINGHOUSE + R AND D PROGRAM + REACTOR, LMFBR + *THERMAL HYDRAULIC ANALYSIS + *COMPUTER PROGRAM + *QUALIFICATION + JACOBS + CIRCULATION, NATURAL

128006
SHERRY RR + ATCHESON DB
USERS MANUAL FOR THE BEHAVE-SST (STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEFR-00001 +. 425 PPS. 7 TABS. 30 FIGS. FEB. 1977

BEHAVE-SST CALCULATES THE STEADY STATE AND OVERPOWER TRANSIENT BEHAVIOR OF CLADDING, FUEL AND VOIDAGE IN OXIDE LMFBR FUEL RODS PRIOR TO CLADDING FAILURE. THE CODE CALCULATES THE STRESS, STRAIN, DISPLACEMENT AND TEMPERATURE FIELDS IN THE FUEL AND CLADDING. PROCESSES SIMULATED INCLUDE CRACKING OF FUEL, DILATION OF FUEL AND CLADDING AS A RESULT OF IRRADIATION EFFECTS AND THERMAL EXPANSION AND FUEL DENSIFICATION CAUSED BY BOTH STRESS AND DIFFUSION CONTROLLED PROCESSES.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

COMPUTER PROGRAM + *FUEL ROD + TEMPERATURE + CLADDING + THERMAL MECHANICAL EFFECT + RADIATION DAMAGE + REACTOR, LMFBR + TRANSIENT + DISTRIBUTION

128452
HAN JT
BLOCKAGES IN LMFBR FUEL ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND THEORETICAL STUDIES
OAK RIDGE NATIONAL LAB., TENN.
ORNL/SM-5839 +. 143 PPS. 14 TABS. 115 FIGS. 53 REFS. SEPT. 1977

THIS IS A STATE-OF-THE-ART REPORT ON THE THERMAL-HYDRAULIC EFFECTS OF FLOW-CHANNEL BLOCKAGES IN LIQUID-METAL FAST BREEDER REACTOR (LMFBR) PIN BUNDLES. MOST OF THE EXPERIMENTAL AND THEORETICAL STUDIES FOR SIMULATING BLOCKAGES IN VARIOUS PROTOTYPE LMFBR FUEL ASSEMBLIES DONE IN THE UNITED STATES AND ABROAD THROUGH 1976 ARE PRESENTED AND SUMMARIZED. A BRIEF SUMMARY ON BLOCKAGE DETECTION IS INCLUDED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

FLOW BLOCKAGE + REACTOR, LMFBR + OUT OF PILE EXPERIMENT + FLOW DISTRIBUTION + ORNL + JACOBS

128456
CHANG LK
THE PREDICTION OF TEMPERATURE DISTRIBUTION OF A SUBASSEMBLY INCLUDING INTERSUBASSEMBLY HEAT TRANSFER
ARGONNE NATIONAL LAB., ILL.
8 PPS. 2 TABS. 4 FIGS. 7 REFS. NUCLEAR ENGINEERING & DESIGN. 42(2), PP. 223-31 (JULY 1977)

A THREE-DIMENSIONAL THERMAL HYDRAULIC CODE, CLUSTER, HAS BEEN DEVELOPED IN ORDER TO PREDICT THE TEMPERATURE PROFILE IN A CLUSTER OF SEVEN SUBASSEMBLIES DURING STEADY STATE CONDITIONS. THE SUBASSEMBLIES UNDER CONSIDERATION INCLUDE BOTH PIN BUNDLE AND REFLECTOR TYPES OF SUBASSEMBLIES. AN IMPLICIT FINITE DIFFERENCE REPRESENTATION OF THE GOVERNING ENERGY EQUATION IS EMPLOYED. GOOD AGREEMENT WAS OBTAINED BETWEEN THE ANALYTICAL RESULTS AND THE MEASURED DATA.

COMPUTER PROGRAM, DIGITAL + THERMAL HYDRAULIC ANALYSIS + SUBCHANNEL ANALYSIS + REACTOR, LMFBR + COMPARISON,

128456 *CONTINUED*
THEORY AND EXPERIENCE

129502
ROYL P + KUCZERA B
ANALYSIS OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SNR-300 MARK IA CORE WITH MODELING OF FAILURE INCOHERENCE
GESELLSCHAFT FUR KERNFORSCHUNG, KARLSRUHE, F.R. GERMANY
10 PPS, 3 TABS, 8 FIGS, 14 REFS, NUCLEAR ENGINEERING & DESIGN, 43(2), PP. 239-48 (SEPT. 1977)

INCOHERENCY EFFECTS DUE TO THE STATISTICAL NATURE OF FUEL ROD FAILURE HAVE BEEN ASSESSED FOR TRANSIENT OVERPOWER (TOP) ACCIDENTS WITH DIFFERENT INITIATING RAMP RATES. CHARACTERISTIC SINGLE SUBASSEMBLY FEEDBACKS FROM SODIUM VOIDING, FUEL INJECTION, AND FUEL SWEEP-OUT AFTER FAILURE WERE CALCULATED AND SUPERIMPOSED INCOHERENTLY. IT IS CONCLUDED FOR THE MILD TRANSIENT NEGATIVE FUEL SWEEP-OUT REACTIVITY FROM EARLY FAILED SUBASSEMBLIES WILL PREVENT THE ACCIDENT FROM REACHING A PROMPT CRITICAL STAGE AND LEAD TO A GRADUAL SHUTDOWN IF THE ASSESSED FAILURE INCOHERENCIES CAN CONSIDERABLY REDUCE THE POTENTIAL TO ACCUMULATE HIGH RAMP RATES IN THE INITIATING PHASE OF TOP ACCIDENTS.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + COMPUTER PROGRAM, DIGITAL + STATISTICAL ANALYSIS + ACCIDENT, CONSEQUENCES + GERMANY

129504
STRUWE D + BOTTONI M + FRIES W
THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN IN-PILE BOILING EXPERIMENTS
GESELLSCHAFT FUR KERNFORSCHUNG, KARLSRUHE, F.R. GERMANY
13 PPS, 2 TABS, 15 FIGS, 13 REFS, NUCLEAR ENGINEERING & DESIGN, 43(2), PP. 259-71 (SEPT. 1977)

IN THE FRAMEWORK OF LMFBR SAFETY ANALYSIS A THEORETICAL INTERPRETATION OF SOME OF THE MOST REPRESENTATIVE OF THE SINGLE PIN EXPERIMENTS OF THE IN-PILE SCARABEE PROJECT HAS BEEN PERFORMED FROM BOTH VIEWPOINTS OF THERMOHYDRAULIC AND FUEL BEHAVIOR USING THE COMPUTER CODES CAPRI-2 AND SATURN-1. THE ANALYSIS AIMED AT INVESTIGATING THE PIN BEHAVIOR FROM THE PREIRRADIATION HISTORY, THROUGH THE OBSERVED SEQUENCE OF EVENTS FOLLOWING A COOLANT MASS FLOW REDUCTION FROM BOILING INCEPTION UP TO PIN BREAKDOWN. A COMPARISON OF THEORETICAL RESULTS WITH EXPERIMENTALLY RECORDED DATA HAS ALLOWED A DEEPER INSIGHT INTO THE PECULIAR FEATURES OF THE EXPERIMENTS AND ENABLED A VALUABLE CODE VERIFICATION.

REACTOR, LMFBR + SODIUM + BOILING + COMPUTER PROGRAM, DIGITAL + COMPARISON, THEORY AND EXPERIENCE + IN PILE EXPERIMENT + THERMAL HYDRAULIC ANALYSIS + GERMANY + ACCIDENT, LOSS OF FLOW + FLOW, TWO PHASE

129506
KAISER A + PEPPLER W
SODIUM BOILING EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO PHASE PRESSURE DROP
GESELLSCHAFT FUR KERNFORSCHUNG, KARLSRUHE, F.R. GERMANY
8 PPS, 2 TABS, 4 FIGS, 10 REFS, NUCLEAR ENGINEERING & DESIGN, 43(2), PP. 285-93 (SEPT. 1977)

TWO SERIES OF QUASI-STEADY STATE SODIUM BOILING EXPERIMENTS HAVE BEEN CARRIED OUT IN AN ELECTRICALLY HEATED SEVEN-PIN BUNDLE. THE TEST PROCEDURE INVOLVED THE GRADUAL REDUCTION OF MASS FLOW RATE THROUGH THE BUNDLE IN A SIMULATION OF THE CONSEQUENCES OF A SLOWLY GROWING BLOCKAGE IN THE LOWER PART OF A REACTOR SUBASSEMBLY. THE RESULTS OBTAINED PROVIDE INFORMATION ON FLOW REGIMES IN THE TWO-PHASE REGION, VAPOR QUALITIES AND FLOW RATES AT WHICH COOLING OF THE BUNDLE CAN BE EFFECTIVELY MAINTAINED, AND THE ULTIMATE INCIDENCE OF DRYOUT. A RELATION FOR THE TWO-PHASE PRESSURE DROP MULTIPLIER OBTAINED FROM ADIABATIC PRESSURE DROP MEASUREMENTS IN THIS GEOMETRY IS GIVEN.

REACTOR, LMFBR + SODIUM + BOILING + FLOW, TWO PHASE + FLOW BLOCKAGE + OUT OF PILE EXPERIMENT + PRESSURE DROP + GERMANY

129518
MILLBURG ML + HASSBERGER JA + BOASSO CJ
NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL ASSEMBLY
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 77-3 +, 163 PPS, JUNE 1977

THE HEAT TRANSFER CHARACTERISTICS OF A CLINCH RIVER BREEDER REACTOR (CRBR) NEARLY PROTOTYPIC FUEL ASSEMBLY IN A LIQUID SODIUM ENVIRONMENT UNDER LOW FLOW CONDITIONS CHARACTERISTIC OF NATURAL CIRCULATION ARE INVESTIGATED. EMPHASIS IS UPON THE PRESENTATION OF TEST DATA DEVELOPED TO SUPPLEMENT ANALYTICAL PREDICTIONS OF HEAT TRANSFER AND FLOW REDISTRIBUTION WITHIN THE NATURAL CIRCULATION RANGE OF REACTOR OPERATION. A DETAILED DESCRIPTION OF THE TEST ASSEMBLY IS PRESENTED, WITH ATTENTION FOCUSED ON THE 217-PIN ELECTRICALLY HEATED ROD BUNDLE THROUGH WHICH AN UPWARD SODIUM FLOW IS DIRECTED. TEST VARIABLES, INCLUDING ASSEMBLY POWER, POWER SKEW, AND AXIAL SODIUM FLOW RATE ARE INTRODUCED, AND TESTING PROCEDURES ARE DISCUSSED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

REACTOR, LMFBR + CLINCH RIVER (LMFBR) + OUT OF PILE EXPERIMENT + CIRCULATION, NATURAL + JACOBS

129901
ABRAMSON PH
THE IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS
ARGONNE NATIONAL LAB., ILL.
10 PPS. 16 TABS. 16 FIGS. NUCLEAR TECHNOLOGY. 35(1). PP. 87-96 (MID-AUG. 1977)

IN THE EVENT OF A LOCA BEING ACCOMPANIED BY AN LMFBR FAILURE TO SCRAM, THE REACTOR COULD GO PROMPT CRITICAL, GENERATING A LARGE AMOUNT OF NEUTRONIC HEAT ON A MILLISECOND TIME SCALE. IT WAS FOUND THAT FUEL-TO-STEEL HEAT TRANSFER HAS A MINIMAL INFLUENCE UPON THE NEUTRONIC ENERGY DEPOSITION DURING THE PROMPT BURST BUT THAT IT CAN PLAY AN IMPORTANT ROLE IN MATERIAL BEHAVIOR IN LATER STAGES OF THE HCDA. FURTHERMORE, RESULTS OBTAINED INDICATE THAT CALCULATIONS OF THERMODYNAMIC POTENTIAL ENERGY THROUGH ADIABATIC EXPANSION TO ONE ATMOSPHERE ARE CONSERVATIVE IF PERFORMED AT THE END OF THE PROMPT BURST AND THAT FUEL-TO-STEEL HEAT TRANSFER MAY SIGNIFICANTLY REDUCE THE AVAILABLE WORK ENERGY WITHIN THE NEXT 20 MS.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + HEAT CONDUCTANCE, FUEL TO CLAD + CORE MELTDOWN + COMPUTER PROGRAM, DIGITAL + THERMAL TRANSIENT + ANL + ACCIDENT, CONSEQUENCES

130874
PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM CYCLE CONDITIONS
GENERAL ELECTRIC CO. + BECHTEL CORP.
TID-27,745/6 + GEFR-00099 +. APPROX. 160 PPS. TABS. FIGS. JUNE 1977

BECAUSE OF THE INCREASED CONCERN ABOUT TECHNOLOGICAL PROBLEMS ARISING FROM HIGH TEMPERATURES, AND IN THE LIGHT OF THE INCREASED AWARENESS OF THE PRIMARY SOURCE OF THE BREEDER BENEFITS, A MAJOR EFFORT WAS INITIATED IN 1975 TO REEXAMINE THE LMFBR OPERATING TEMPERATURES AND STEAM CONDITIONS. THIS WORK WAS DONE AS A PART OF THE PLBR PROJECT SPONSORED BY ERDA AND EPRI. THE RESULTING ANALYSIS IS THE MOST COMPLETE ASSESSMENT EVER MADE FOR THE LMFBR WITH REGARD TO OPTIMIZING THE CHOICE OF OPERATING TEMPERATURES AND STEAM CONDITIONS. THE RESULTS OF THAT ASSESSMENT ARE REPORTED IN THIS DOCUMENT, AND IN THE COMPLEMENTARY VOLUME, VOLUME III, PART 3, PREPARED BY BECHTEL CORPORATION.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*DESIGN STUDY + REACTOR, LMFBR + *REACTOR COOLANT + TEMPERATURE + HEAT TRANSFER ANALYSIS + PLBR (LMFBR) + SYSTEM DESCRIPTION + THERMAL TRANSIENT + COOLANT CHEMISTRY + DNB + SODIUM

6. REACTOR TRANSIENTS, KINETICS, AND STABILITY

120171
KIRK WL
PHOEBUS/UHTREX: A PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL
LOS ALAMOS SCIENTIFIC LABORATORY, NEW MEXICO
LA-NUREG-6501-MS +. 78 PPS. 22 TABS. 44 FIGS. 14 REFS. OCT. 1976

THE RESULTS OF A BRIEF PRELIMINARY DESIGN STUDY OF A FACILITY FOR TRANSIENT NUCLEAR TESTS OF FAST BREEDER REACTOR FUEL ARE DESCRIBED. THE STUDY IS BASED ON THE USE OF A REACTOR BUILDING ORIGINALLY BUILT FOR THE UHTREX REACTOR, AND THE USE OF SOME REACTOR HARDWARE AND REACTOR DESIGN AND FABRICATION TECHNOLOGY REMAINING FROM THE PHOEBUS-2 REACTOR. FACILITY PERFORMANCE IN CONJUNCTION WITH A REFERENCE 127-FUEL PIN EXPERIMENT IS DESCRIBED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + REACTOR TRANSIENT + REACTOR, BREEDER + UHTREX (GCR) + PERFORMANCE + FUEL ELEMENTS + HJCK + NRC-7 + FUEL ROD + JACOBS

121481
WEISBIN CR + MARABLE JH + LUCIUS JL + OBLOW EM + MYNATT FR + PEELLE RW + PEREY FG
APPLICATION OF FORSS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR BENCHMARK ANALYSIS
OAK RIDGE NATIONAL LABORATORY, TENNESSEE
ORNL/TM-5563 + ENDF-236 +. 117 PPS. 16 TABS. 40 FIGS. 47 REFS. DEC. 1976

***FORSS IS A CODE SYSTEM USED TO STUDY RELATIONSHIPS BETWEEN NUCLEAR REACTION CROSS SECTIONS, INTEGRAL EXPERIMENTS, REACTOR PERFORMANCE PARAMETER PREDICTIONS, AND ASSOCIATED UNCERTAINTIES. THEORY, CODE DESCRIPTION, AND RESULTS OF APPLYING FORSS TO FAST REACTOR BENCHMARKS ARE PRESENTED. FOR VARIOUS ASSEMBLIES AND REACTOR PERFORMANCE PARAMETERS, NUCLEAR DATA SENSITIVITIES WERE COMPUTED. COMPREHENSIVE LIBRARIES OF ENERGY-DEPENDENT COEFFICIENTS HAVE BEEN DEVELOPED IN A RETRIEVABLE FORMAT. UNCERTAINTIES INDUCED BY NUCLEAR DATA WERE QUANTIFIED. NUCLEAR DATA ACCURACY REQUIREMENTS TO MEET SPECIFIED PERFORMANCE CRITERIA AT MINIMUM EXPERIMENTAL COST WERE DETERMINED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*COMPUTER PROGRAM, DIGITAL + REACTOR PHYSICS + SENSITIVITY ANALYSIS + CROSS SECTION + PARAMETER + *REACTOR, FAST + REACTOR, LMFBR + *MATHEMATICAL TREATMENT + JACOBS

122579
BELL CR + BLEIWEIS PB + BOUDREAU JE
SINNER-I: AN S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, EULERIAN, RECRITICALITY CODE FOR LMFBR DISRUPTED CORE ANALYSIS
LOS ALAMOS SCIENTIFIC LABORATORY, NEW MEXICO
LA-NUREG-6467-MS +. 331 PPS. 33 TABS. 50 FIGS. JAN. 1977

PHYSICAL MODELS, NUMERICAL MODELS, AND PROGRAM DESCRIPTION ARE PRESENTED IN SINNER-I, A COMPUTER PROGRAM WHICH PREDICTS THE NEUTRONIC AND FLUID DYNAMIC BEHAVIOR OF AN LMFBR DURING A HYPOTHETICAL CORE DISRUPTIVE ACCIDENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*COMPUTER PROGRAM + *ACCIDENT, CORE DISRUPTIVE + REACTOR, LMFBR + DIFFUSION + TRANSPORT + REACTOR PHYSICS + CORE MELTDOWN + HYDRAULIC ANALYSIS + EQUATION OF STATE + HJCK + NRC-7 + JACOBS

123197
MATHER DJ
ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED FAST REACTORS
UKAEA SAFETY & RELIABILITY DIRECTORATE, WARRINGTON
SRD-R-068P. 15 PPS. 6 FIGS. 4 REFS. DEC. 1976

CALCULATIONS USING THE COMPUTER PROGRAM SARAZE-2 ARE DESCRIBED WHICH ANALYSE SOME MECHANICAL EFFECTS OF SODIUM REMAINING IN THE OUTER CORE REGIONS DURING THE FINAL STAGES OF POSTULATED TRANSIENTS IN FAST REACTORS. IT IS SHOWN THAT THE OVERALL EFFECT OF THE PRESSURE OF SODIUM IS TO REDUCE THE TOTAL ENERGY YIELD, EVEN WHEN THE CENTRE REGION OF THE CORE ARE VOIDED.

AVAILABILITY - THE EDITOR, UKAEA, SAFETY & RELIABILITY DIRECTORATE, CULCHETH, WARRINGTON WA3 4NE UK

ACCIDENT, HYPOTHETICAL + REACTOR TRANSIENT + DOPPLER COEFFICIENT + REACTOR, FAST + REACTOR, LMCR + SODIUM + VOID FRACTION + JACOBS

123318
SCHMIDT TR
LMFBR PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR CORE PULSE REACTOR (ACPR)
SANDIA LABS., ALBUQUERQUE, N.M.
SAND-76-5306 + CONF-761001-1 +. 10 PPS. FROM INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS; CHICAGO, ILL., OCT. 1976

NINE IN-PILE EXPERIMENTS INVOLVING PULSE HEATING OF FUEL PINS TO PARTIAL VAPORIZATION, PROVIDE LMFBR CORE ENERGETICS DATA. IN THREE EXPERIMENTS CONDUCTED WITHOUT SODIUM, OBSERVED ENERGY

123318 *CONTINUED*
DEPOSITIONS UP TO 3200 J PER GM RESULTED IN LOW PRESSURE HISTORIES, NEGLIGIBLE ENERGY CONVERSION RATIOS, AND LARGE UPWARD AXIAL FUEL MOTIONS WITHIN THE CLADDING. WITH SODIUM, SIMILAR OBSERVED ENERGY DEPOSITIONS RESULTED IN LARGE SHARP PRESSURE EVENTS, VERY LOW ENERGY CONVERSION RATIOS, AND WITHIN-CLADDING AXIAL FUEL MOTIONS COMPARABLE TO THE DRY CAPSULE EXPERIMENTS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + *IN PILE EXPERIMENT + *PROMPT CRITICALITY + *EXCURSION, LARGE + *ACCIDENT, CORE DISRUPTIVE

124107
LUDEWIG H
A PRELIMINARY ANALYSIS OF THE AHL PROPOSED SAFETY RELATED CRITICAL EXPERIMENTS
BROOKHAVEN NATIONAL LAB., UPTON, N.Y.
BNL-NUREG-22223 +. 28 PPS, TABS, FIGS, REFS, JAN. 1977

RESULTS ARE REPORTED OF EXPERIMENTS USING SMALL, SIMPLE ASSEMBLIES. NO SIMULATION OF LMFBR DESIGN IS INTENDED, BUT MOST NUCLIDES INCLUDED MAY APPEAR IN AN LMFBR. RESULTS INDICATE THAT DIFFUSION THEORY UNDERESTIMATES REACTIVITY VALUES BY 1-1.5 PER CENT COMPARED TO TRANSPORT THEORY. USE OF A DEPLETED URANIUM REFLECTOR TO ISOLATE THE ASSEMBLY FROM NEUTRON IN-LEAKAGE FROM THE ROOM IS TREATED.***A SEQUENCE IS DISCUSSED IN WHICH A CENTRALLY LOCATED CONTROL ROD REMAINS IN PLACE WHILE FUEL IS COMPACTED AWAY FROM IT.

AVAILABILITY - H. LUDEWIG, FAST REACTOR SAFETY DIV., DEPT. OF APPLIED SCIENCE, BROOKHAVEN NATIONAL LAB., UPTON, N.Y. 11973

*JACOBS + *CRITICALITY EXPERIMENT + REACTOR, SAFETY RESEARCH + REACTOR, LMFBR + *MATHEMATICAL STUDY + MONTE CARLO + TRANSPORT THEORY + COMPARISON, THEORY AND EXPERIENCE + *REACTOR PHYSICS + HJCK + NRC-7

125632
MAJUMDAR D + PYUN JJ
REVIEW OF THE TRANSITION PHASE OF CORE-DISRUPTIVE ACCIDENTS IN LMFBRS
BROOKHAVEN NATIONAL LAB., UPTON, N.Y.
BNL-NUREG-21797 +. 104 PPS, 4 TABS, FIGS, 112 REFS, AUG. 15, 1976

THE PRESENT STATUS OF THE CORE-DISRUPTIVE PHASE OF AN ACCIDENT IN AN LMFBR IS REVIEWED. ALSO, A CRITICAL SURVEY OF METHODS USED IN ANALYZING THIS PHASE IS PRESENTED AND CONCLUSIONS ARE GIVEN.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + *ACCIDENT, CORE DISRUPTIVE + *ACCIDENT ANALYSIS + SURVEY + COMPARISON + *ACCIDENT, HYPOTHETICAL + HJCK + NRC-7

125644
ERDMAN CA + JOHNSON MB
SOME ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER ACCIDENT IN LMFBR'S
UNIV. OF VA., CHARLOTTESVILLE
NUREG-0277 +. 27 PPS, JUNE 1977

ASPECTS OF SUBASSEMBLY VOIDING ARE PRESENTED. THE DEGREE TO WHICH TOP RELATED EXPERIMENTS ARE CONSISTENT WITH CURRENT MODELING OF VOIDING IN TOP SITUATIONS IS ASSESSED. SEVERAL CODES CAN REPRODUCE EXPERIMENTAL RESULTS BUT NO AVAILABLE CODE ACCURATELY PREDICTS RESULTS IN ADVANCE.***RESULTS OF ATTEMPTS TO MODEL A TREAT EXPERIMENT ARE PRESENTED AND DISCUSSED.***POSSIBILITIES FOR RAPID SODIUM VOIDING WITH LITTLE COMPENSATING FUEL MOTION IN LOF-D-TOP WERE REVIEWED. MAJOR PHENORENA ARE GAS AVAILABILITY AT FAILURE, CHARACTERIZATION OF FAILURE, AND FUEL/SODIUM ENERGY AND MOMENTUM COUPLING. RESULTS OF ADDITIONAL VOIDING CALCULATIONS BASED ON A SMALL SCALE FCI POINTED TO LIMITS OF 40 DOLLARS/SEC ON POTENTIAL VOIDING RAMP RATES FOR CRBR.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*JACOBS + *REACTOR, LMFBR + *ACCIDENT ANALYSIS + *ACCIDENT, HYPOTHETICAL + *ACCIDENT, LOSS OF FLOW + SODIUM + *REACTIVITY EFFECT, VOID + *VOID + *ACCIDENT MODEL

126176
TZANOS CP + BARTHOLD WP + BOWERS CH
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS
ARGONNE NATIONAL LAB., ILL.
CONF-761081-43 +. 18 PPS, FROM INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS: CHICAGO, ILL., OCT. 1976

DESIGN-RELATED SAFETY-ENHANCING FEATURES SUCH AS (1) EXTENDED PUMP COASTDOWN, (2) INCREASED NEGATIVE REACTIVITY FEEDBACKS, (3) REDUCED SODIUM VOID REACTIVITY, AND (4) SELF-ACTUATED SHUTDOWN SYSTEMS ARE EVALUATED. PRIMARY EMPHASIS IS PLACED ON PREVENTING OR LIMITING CORE DAMAGE. ATTENTION IS ALSO GIVEN TO FEATURES AIMED AT MITIGATION OF THE ENERGETICS POTENTIAL OF HYPOTHETICAL CORE-DISRUPTIVE ACCIDENTS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + *SAFETY ANALYSIS + PUMPS + TRANSIENT + REACTIVITY, NEGATIVE + REACTIVITY EFFECT, VOID +

126176 *CONTINUED*
SHUTDOWN MECHANISM, SELF + ACCIDENT, CORE DISRUPTIVE

126673
CLAUZON PP + COULON P + PENET F
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX
CENTRE D'ETUDES NUCLEAIRES DE CADARACHE, FRANCE
CONF-761001(VOL. 1) +. 15 PPS. PP. 61-75 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS: CHICAGO, ILL., OCT. 5-8, 1976

PHENIX HAS BEEN IN OPERATION FOR OVER 2 YEARS AND THE INFORMATION FOR CORE SAFETY ANALYSIS DERIVED FROM ITS OPERATION CAN BE DIVIDED IN 2 AREAS. FIRST, AT NOMINAL STATE OF THE CORE, THE COMPARISON BETWEEN OBSERVED PHYSICAL PROPERTIES AT START-UP AND DURING ITS LIFE AND THE CORRESPONDING CALCULATIONS GIVES SUPPORT TO THE SAFETY EVALUATION. FURTHER, THE CORE BEHAVIOR OF PHENIX HAS BEEN ANALYZED ON 2 ASPECTS: ITS NEUTRONIC FEEDBACKS TO THE MAIN POSSIBLE PERTURBATIONS OF ITS PHYSICAL STATE, AND ITS CAPABILITY OF NATURAL SODIUM CONVECTION IN CASE OF PUMP COAST DOWN.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

PHENIX (LMFBR) + REACTOR, LMFBR + REACTOR STARTUP EXPERIENCE + PROPERTY, PHYSICAL + COMPARISON, THEORY AND EXPERIENCE + PERTURBATION METHOD + REACTOR PHYSICS + HEAT TRANSFER, CONVECTION

126713
FRANKE E
CALCULATION OF FAST BREEDER SPECTRA
5 PPS, 30 REFS, KERNENERGIE, 19(6), PP. 173-77 (JUNE 1976)

A GOOD APPROXIMATION IN CALCULATING FAST BREEDER SPECTRA IS GIVEN BY THE ASYMPTOTIC REACTOR CONCEPT. THE APPROXIMATIONS MOST FREQUENTLY USED ARE THE B1 EQUATION, THE P1 EQUATION, THE DIFFUSION EQUATION, AND THE EQUATION FOR THE INFINITE MEDIUM. WITH RESPECT TO LETHARGY VARIABLE, THE MULTIGROUP AND THE CONTINUOUSLY SLOWING DOWN (CSD) METHOD REPRESENT ALTERNATIVE CONCEPTS FOR CALCULATING FAST BREEDER SPECTRA. AS THE CSD THEORY DOES NOT INVOLVE VOLUMINOUS SCATTERING MATRICES, THIS TECHNIQUE IS MORE ECONOMICAL IN NUMERICAL REGARD AS COMPARED WITH MULTIGROUP CALCULATIONS.

REACTOR, FAST + REACTOR, BREEDER + *ENERGY SPECTRUM + *REACTOR PHYSICS + REACTOR KINETICS + DIFFUSION + EQUATION

129588
MUNRO FJ + SHEAKS OJ
A STUDY OF THE REACTIVITY EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS
UNIV. OF MARYLAND, COLLEGE PARK
NUREG-0286 +. 62 PPS. REFS. AUG. 1977

THE REACTIVITY EFFECT OF VOID COLLAPSE ON A CORE DISRUPTIVE ACCIDENT IN A SODIUM FREE FAST REACTOR CORE WAS STUDIED. A TWO-DIMENSIONAL TRANSPORT THEORY COMPUTER CODE WAS EMPLOYED TO OBTAIN A REACTIVITY MODEL WHICH INCORPORATED RANDOM DISTRIBUTIONS OF VOIDS IN SPATIAL LOCATION AND BUBBLE SIZE. THIS MODEL WAS IMPLEMENTED INTO VENUS-II AND SEVERAL EXCURSIONS WERE INVESTIGATED FOR THE PURPOSE OF ASSESSING THE EFFECT OF BUBBLE COLLAPSE REACTIVITY ON EXCURSION ENERGY. THE RESULTS INDICATE THAT EXCURSION ENERGY IS SENSITIVE TO THE SHAPE OF THE REACTIVITY VERSUS VOID FRACTION FUNCTION AND THAT REACTIVITY MODELS BASED STRICTLY ON LEAKAGE EFFECTS ARE PROBABLY CONSERVATIVE COMPARED TO MODELS WHICH INCLUDE BOTH SELF-MULTIPLICATION AND LEAKAGE.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + BUBBLE + REACTIVITY EFFECT + COMPUTER PROGRAM, DIGITAL + JACOBS

130829
A COMPENDIUM OF COMPUTER CODES FOR THE SAFETY ANALYSIS OF FAST BREEDER REACTORS
U.S. DEPT. OF ENERGY, WASHINGTON
DOE/ET-0009 +. 431 PPS. TABS. FIGS. REFS. OCT. 1977

FOR OVER 100 CODES THE FOLLOWING QUESTIONS ARE ANSWERED: (1) WHAT DOES THE CODE DO? (2) TO WHAT SAFETY PROBLEMS HAS IT BEEN APPLIED? (3) WHAT ARE THE CODES LIMITATIONS? (4) WHAT IS BEING DONE TO REMOVE THESE LIMITATIONS? (5) HOW DOES THE CODE COMPARE WITH EXPERIMENTAL OBSERVATIONS AND OTHER CODE PREDICTIONS? AND (6) WHAT REFERENCE DOCUMENTS ARE AVAILABLE? THE CODES ARE ALSO CATEGORIZED AS FOLLOWS: (1) STEADY STATE FUEL PIN CHARACTERIZATION, (2) WHOLE CORE ANALYSIS, (3) SUBASSEMBLY ANALYSIS, (4) HEAT TRANSPORT SYSTEM ANALYSIS, (5) POST ACCIDENT HEAT REMOVAL, (6) SODIUM FIRES, (7) AEROSOL BEHAVIOR, (8) ENVIRONMENTAL RELEASE ANALYSIS, (9) PROBABILISTIC ANALYSIS, (10) CODES FOR ANALYTICAL SUPPORT OF SAFETY EXPERIMENTS, AND (11) MISCELLANEOUS CODES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*COMPUTER PROGRAM + REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + ACCIDENT, FUEL SLUMP + FLOW BLOCKAGE + THERMAL HYDRAULIC ANALYSIS + TRANSIENT + AEROSOL + PROBABILITY + SODIUM + FIRE + CORE MELTDOWN + DECAY HEAT + ACCIDENT, HYPOTHETICAL + *SAFETY ANALYSIS + DOSE + ENVIRONMENT + HEAT TRANSFER ANALYSIS + JACOBS

7. FISSION PRODUCT RELEASE, TRANSPORT, AND REMOVAL

119193
MCPHEETERS CC + RAUE D
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING
ARGONNE NATIONAL LABORATORY, ILLINOIS
CONF-760503-3 +. 7 PPS. FROM INTERNATIONAL CONFERENCE ON LIQUIFIED METAL TECHNOLOGY IN ENERGY PRODUCTION: CHAMPION, PA, MAY 3, 1976

CONTROL OF TRITIUM IN THE SODIUM COOLANT OF LMFBRS IS IMPORTANT FOR ACHIEVING AS LOW AS PRACTICABLE RELEASE OF RADIOACTIVITY. COLD-TRAPPING HAS BEEN SHOWN TO BE AN EFFECTIVE METHOD FOR CONTROLLING HYDROGEN IN SODIUM AND SHOULD BE EFFECTIVE FOR CONTROLLING TRITIUM AS WELL. TWO MECHANISMS FOR REMOVAL OF TRITIUM FROM SODIUM HAVE BEEN STUDIED: (1) COPRECIPITATION OF HYDROGEN AND TRITIUM FROM SOLUTION IN SODIUM IN A COLD TRAP AND (2) ISOTOPIC EXCHANGE OF TRITIUM IN SODIUM WITH HYDROGEN IN SOLID NAH IN A COLD TRAP. THE ISOTOPIC EXCHANGE MECHANISM BY ITSELF CANNOT BE EXPECTED TO ADEQUATELY CONTROL TRITIUM IN LMFBRS. HYDROGEN SOURCES SUCH AS CORROSION IN THE STEAM GENERATORS WILL BE IMPORTANT FACTORS IN CONTROLLING THE TRITIUM LEVEL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FILTER, TRAP + DECONTAMINATION + REACTOR, LMFBR + TRITIUM + SODIUM + HYDROGEN

120340
FEE GG
DECEMBER 1976 MONTHLY HIGHLIGHTS FOR OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE NATIONAL LABORATORY
OAK RIDGE NATIONAL LABORATORY, TENNESSEE
ORNL/NUREG/TM-83 +. 21 PPS. JAN. 1977

THIS PROGRESS REPORT CONTAINS SHORT (1 TO 4 PAGE) SUMMARIES OF THE ACCOMPLISHMENT DURING THE MONTH ON THE FOLLOWING ORNL PROJECTS: HEAVY SECTION STEEL TECHNOLOGY PROGRAM, FISSION PRODUCT BETA AND GAMMA ENERGY RELEASE, LOCA RELEASE FROM LWR FUEL, MULTIROD BURST TESTS, NUCLEAR SAFETY INFORMATION CENTER, PWR BLOWDOWN HEAT TRANSFER-SEPARATE EFFECTS, ZIRCALOY FUEL CLADDING COLLAPSE STUDIES, ZIRCONIUM METAL WATER OXIDATION KINETICS, AEROSOL RELEASE AND TRANSPORT FROM LMFBR FUEL, HTGR SAFETY ANALYSIS AND RESEARCH, AND DESIGN CRITERIA FOR PIPING AND NOZZLES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LWR + HSST + ENERGY LEVEL + FISSION PRODUCT RELEASE + GROSS BETA + GROSS GAMMA + FAILURE, FUEL ELEMENT + NSIC + BLOWDOWN + HEAT TRANSFER + ZIRCALOY + FAILURE, CLADDING + METAL WATER REACTION + ZIRCONIUM + OXIDATION + REACTOR, LMFBR + AEROSOL + FISSION PRODUCT TRANSPORT + REACTOR, HTGR + ACCIDENT ANALYSIS + DESIGN CRITERIA + PIPES AND PIPE FITTINGS + R AND D PROGRAM + SAFETY PROGRAM + HJCK + NRC-2 + NRC-3 + NRC-5 + NRC-7 + NRC-8

121014
HILLIARD RK + MCCORMACK JD + POSTMA AK
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 76-41 +. 267 PPS. 51 TABS. 58 FIGS. DEC. 1976

NINETEEN DIFFERENT AIR CLEANING CONCEPTS ARE ARRANGED INTO TWENTY-FOUR SYSTEMS AND EVALUATED FOR USE AS ACCIDENT MITIGATING SYSTEMS IN LMFBR PLANTS, BOTH SINGLE, LOW-LEAKAGE CONTAINMENT PLANTS AND ONCE-THROUGH OPERATION, APPLICABLE TO CONTAINMENT/CONFINEMENT PLANTS ARE CONSIDERED. PLANT CHARACTERISTICS AFFECTING AIR CLEANING REQUIREMENTS ARE DEFINED FOR 1000 MWE PLANTS AND A SODIUM AND RADIOLOGICAL RELEASE TERM IS POSTULATED. THE ACCIDENT CONDITIONS UNDER WHICH THE EMERGENCY AIR CLEANING SYSTEM (EACS) MUST FUNCTION IS ESTABLISHED BY USE OF SOFIRE-II AND MAA-3B COMPUTER CODES. CRITERIA ARE DEVELOPED FOR EVALUATING THE VARIOUS SYSTEMS AND FOR ASSIGNING COMPARATIVE RATINGS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

AIR CLEANING + FISSION PRODUCT RELEASE + AEROSOL + CONTAINMENT + DESIGN CRITERIA + FILTER, BED + REACTOR, LMFBR + SODIUM + CHARCOAL + SCRUBBER + FILTER, SAND + FILTERS + JACOBS

127835
SHEPPARD JD + LEAVELL GH + SHAHROKHI F + WYNN RC
QUARTERLY PROGRESS REPORT ON THE ADVANCED TWO-PHASE INSTRUMENTATION PROGRAM FOR JANUARY-MARCH 1977
OAK RIDGE NATIONAL LAB., TENN.
ORNL/NUREG/TM-119 +. 13 PPS. 3 FIGS. 8 REFS. JULY 1977

AN INSTRUMENTED PIPING SPOOL PIECE HAS BEEN DESIGNED TO IMPROVE THE ACCURACY AND PRECISION OF TWO-PHASE FLOW MEASUREMENTS. THE ALGORITHM FOR CALCULATING NONSTATIONARY VELOCITIES BY INSTRUMENT SIGNAL CORRELATION WAS MODIFIED TO USE THE NORMALIZED CROSS-COVARIANCE FUNCTION RATHER THAN THE CROSS-CORRELATION FUNCTION TO DETERMINE TRANSIT TIME. A PRELIMINARY FEASIBILITY STUDY OF INNOVATIVE TWO-PHASE FLOW INSTRUMENTS HAS BEEN CONDUCTED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FLOW, TWO PHASE + *INSTRUMENT, FLOW + MEASUREMENT + FLOW + *EQUIPMENT DEVELOPMENT + HJCK + NRC-2

123854
JORDAN H + BAYRUTT P + GIESEKE JA + DENNING RS
FISSION PRODUCT TRANSPORT ANALYSIS. QUARTERLY PROGRESS REPORT JULY THROUGH SEPTEMBER 1976
BATTELLE COLUMBUS LABS., OHIO
BNI-NUREG-1965 +. 22 PPS. 2 REFS. DEC. 30, 1976

FISSION PRODUCTS THAT ESCAPE TO THE ENVIRONMENT DURING A HYPOTHETICAL CONTROLLED LOSS-OF-COOLANT ACCIDENT (LOCA) IN A LIGHT WATER REACTOR (LWR) MUST SUCCESSIVELY PENETRATE FOUR DISTINCT BARRIERS: (1) THE FUEL MATRIX. (2) THE FUEL ROD CLADDING. (3) THE PRIMARY SYSTEM ENVELOPE. AND (4) THE CONTAINMENT SYSTEM BOUNDARY. A REALISTIC ASSESSMENT OF THE ENVIRONMENTAL DOSE DUE TO A LOCA. THEREFORE. REQUIRES A REALISTIC ASSESSMENT OF EACH OF THESE PENETRATIONS. IT IS THE TASK OF THIS PROJECT TO PROVIDE SUCH AN ASSESSMENT OF THE PENETRATION OF THE PRIMARY SYSTEM ENVELOPE OF A PRESSURIZED WATER REACTOR (PWR) AND A BOILING WATER REACTOR (BWR) AND TO ASSESS THE RELATED FISSION PRODUCT PENETRATION OF A FAILED SPENT FUEL SHIPPING CASK. IN DOING SO. RELIANCE IS PLACED ON THE DEVELOPMENT OF A SOURCE TERM (I.E.. THE FISSION PRODUCT PENETRATION RATE OF THE FUEL CLADDING BARRIER) UNDER A SEPARATE PROJECT AT ORNL AND INDEED THESE TWO PROJECTS ARE CLOSELY COORDINATED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE. U. S. DEPARTMENT OF COMMERCE. SPRINGFIELD. VA. 22161

CONTAINMENT + FISSION PRODUCT RELEASE + COMPUTER PROGRAM + ANALYTICAL MODEL + CLADDING + FISSION PRODUCT TRANSPORT + REACTOR. PWR + REACTOR. BWR + STEAM + WATER VAPOR + HUCK + NRC-3 + NRC-4 + JACOBS

123864
COHAR CL + SEEFELDT WB + COHEN BL + MOWELLS G + MECHAM WJ + STEINDLER MJ + STANNARD JN
PLUTONIUM: FACTS AND INFERENCES
ELECTRIC POWER RESEARCH INST.. PALO ALTO. CALIF.
EPRI-EA-43-SR +. 137 PPS. FIGS. REFS. AUG. 1976

SUMMARIZES WHAT IS KNOWN ABOUT PLUTONIUM AND THE REASONABLE INFERENCES THAT CAN BE DRAWN FROM THAT KNOWLEDGE: DETAILS AND SUPPORTING DATA ARE PRESENTED IN THE MAIN BODY OF THE REPORT. SUCH INFORMATION WILL NOT ENTIRELY DISPEL SOCIAL CONCERN OR EVEN ANSWER THE SPECIFIC QUESTIONS OF RISK IN AN UNEQUIVOCAL WAY. BUT AT LEAST IT SHOULD HELP PLACE THE PLUTONIUM ISSUE IN CLEARER PERSPECTIVE AND SEPARATE IT FROM THE MANY OTHER ISSUES THAT MAY ULTIMATELY BE MORE IMPORTANT IN MAKING DECISIONS ABOUT THE FUTURE USE OF NUCLEAR POWER.

AVAILABILITY - RECORDS & REPORTS CENTER. ELECTRIC POWER RESEARCH INST.. P.O. BOX 10412. PALO ALTO. CALIF. 94303

FUEL CYCLE + FUEL REPROCESSING + EXPLOSION + REACTOR. LMFBR + PLUTONIUM + FIRE + ZIRCONIUM + JACOBS + FILTERS

124541
YARBRO OD + MAILEN JC + STEPHENSON MJ
RETENTION OF GASEOUS ISOTOPES
OAK RIDGE NATIONAL LAB. + OAK RIDGE GASEOUS DIFFUSION PLANT. TENN.
IAEA-CN-36/408 +. 12 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG. AUSTRIA. MAY 2-13. 1977

THE RETENTION OF GASEOUS FISSION PRODUCTS AT COMMERCIAL REACTOR FUEL REPROCESSING PLANTS IS PRESENTLY LIMITED TO A MODEST RETENTION OF IODINE WHERE REPROCESSING COOLING TIMES ARE IN THE RANGE OF 180 DAYS OR LESS. RECENT REGULATORY TRENDS HAVE BEEN DIRECTED TOWARD FURTHER REDUCTION REQUIREMENTS OF THE ALREADY SMALL ENVIRONMENTAL EFFECTS OF EFFLUENTS FROM NUCLEAR FUEL REPROCESSING PLANTS. IN ADDITION TO THE DESIRE TO REDUCE THE ENVIRONMENTAL EFFECTS OF FUEL REPROCESSING. THE HIGHER BURNUP AND SPECIFIC POWER LEVELS OF LMFBR FUELS AND THE ECONOMIC INCENTIVE TO REDUCE REPROCESSING COOLING TIMES WILL PLACE MORE STRINGENT DEMANDS ON SYSTEMS FOR THE CONTROL OF EFFLUENTS FROM THE LMFBR FUEL REPROCESSING PLANT.

AVAILABILITY - UNIPUB. INC.. P.O. BOX 433. NEW YORK. N.Y. 10016

FISSION PRODUCT. AIRBORNE + AIRBORNE RELEASE + FUEL REPROCESSING + REACTOR. LMFBR + *RETENTION + GAS + *RADIOLYTIC GAS + IODINE

125653
HAYNS MR + WOOD MH
MODELS OF FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY STATE AND TRANSIENT CONDITIONS
UKAEA RESEARCH GROUP. HARWELL
AERE-TP-676 +. 43 PPS. OCT. 1976

THE RATE THEORY IS USED TO DESCRIBE THE NUCLEATION AND EVOLUTION OF THE FISSION GAS BUBBLE POPULATION. AT LOWER TEMPERATURES THE MODEL IS BASED UPON THE NOTION OF THE RANDOM MOTION OF SINGLE GAS ATOMS AND GAS BUBBLES AND INCLUDES THE EFFECTS OF RESOLUTION AND COALESCENCE WITHIN THE BUBBLE POPULATION WHILST AT HIGHER TEMPERATURES THE DIRECTED MOTION OF BUBBLES IN A TEMPERATURE GRADIENT. AGAIN INCLUDING RESOLUTION AND COALESCENCE. IS SHOWN TO BE THE MOST IMPORTANT MECHANISM. THERE ARE FURTHER DIFFICULTIES WITHIN EACH OF THESE OVERALL SCHEMES AND THIS REPORT HIGHLIGHTS IN PARTICULAR THE SENSITIVITY OF THE RESULTS OF THE RANDOM MOTION MODEL TO THE RESOLUTION RATE AND BUBBLE MOBILITY.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER. P.O. BOX 62. OAK RIDGE. TENN. 37830

125653 *CONTINUED*
ANALYTICAL MODEL + FISSION GAS RELEASE + EXPANSION + FUEL ROD + REACTOR, LMFBR + JACOBS

127992
WRIGHT AL + SMITH AM + KRESS TS
FUEL AEROSOL SIMULANT TEST (FAST) PLAN
OAK RIDGE NATIONAL LAB., TENN.
ORNL/NUREG/TM-129 +. 19 PPS. 4 TABS. 5 FIGS. 10 REFS. SEPT. 1977

THIS REPORT PRESENTS THE WORK PLAN FOR THE FUEL AEROSOL SIMULATION TEST (FAST), WHICH CONSTITUTES TASK 5 OF THE AEROSOL RELEASE AND TRANSPORT (ART) PROGRAM, SPONSORED BY THE DIVISION OF REACTOR SAFETY RESEARCH OF THE NUCLEAR REGULATORY COMMISSION. THESE TESTS INVOLVE THE STUDY OF THE FORMATION, RISE, AND CONDENSATION OF A SURROGATE LMFBR FUEL (UO2) VAPOR BUBBLE PRODUCED IN LIQUID SODIUM TO SIMULATE PHENOMENA ASSOCIATED WITH HYPOTHETICAL CORE-DISRUPTIVE ACCIDENTS (HCDAS). UO2 BUBBLES WILL BE PRODUCED BY THE CAPACITOR DISCHARGE VAPORIZATION (CDV) TECHNIQUE. TESTS THROUGH FY 1979 WILL BE DONE IN ARGON, WATER, AND IN SODIUM; RESULTS WILL BE ANALYZED USING MODELS DEVELOPED IN THE ART PROGRAM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

AEROSOL + SODIUM + REACTOR, LMFBR + BUBBLE + ACCIDENT, HYPOTHETICAL + ACCIDENT, CORE DISRUPTIVE + URANIUM DIOXIDE + ELECTRIC ARC + TRANSIENT + R AND D PROGRAM + FISSION PRODUCT RELEASE + PLUTONIUM + ARGON + HJCK + NRC-7 + JACOBS

129276
SCRIPSICK RC + GRAY DC + TILLERY MI
AEROSOL SAMPLING AND CHARACTERIZATION FOR HAZARD EVALUATION
LOS ALAMOS SCIENTIFIC LAB., N.M.
LA-6777-PR +. 23 PPS. 7 TABS. 14 FIGS. 14 REFS. APRIL 1977

A SYSTEM FOR ESTIMATING DISSOLUTION RATES OF PLUTONIUM AEROSOLS WAS DEVELOPED. STUDIES INDICATE THAT PLUTONIUM AEROSOLS FOUND IN THE FIELD HAVE A RAPID INITIAL DISSOLUTION PHASE FOLLOWED BY A SLOWER SECONDARY PHASE. THREE METHODS OF PARTICLE SIZING AIR SAMPLES COLLECTED ON MEMBRANE FILTERS WERE INVESTIGATED. THE MOST PROMISING WAS A SCANNING ELECTRON MICROSCOPE ELECTRON MICROPROBE (SEM-EMP) METHOD. AIRBORNE CONTAMINATION RECORDS WERE STUDIED. THE PHYSICOCHEMICAL PROPERTIES OF A PLUTONIUM AEROSOL EXISTING IN THE FACILITY WERE INVESTIGATED IN RELATION TO PLUTONIUM HANDLING OPERATIONS. THE TECHNIQUES DEVELOPED HAVE INDICATED SOME AREAS OF THE AEROSOL SURVEILLANCE SYSTEM THAT NEED IMPROVEMENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

AEROSOL + CODES AND STANDARDS + GUIDE + SAMPLING + REACTOR, LMFBR + PLUTONIUM + GLOVE BOX + HAZARDS ANALYSIS

129277
GIESEKE JA + REED LD + JORDAN H + LEE KW
CHARACTERISTICS OF AGGLOMERATES OF SODIUM OXIDE AEROSOL PARTICLES
BATTELLE COLUMBUS LABS., OHIO
BMI-NUREG-1977 +. 32 PPS. 1 TAB. 10 FIGS. 15 REFS. AUG. 1, 1977

ACCURATE MACROSCOPIC PREDICTIONS OF AEROSOL POPULATION BEHAVIOR WITHIN ENCLOSED CONTAINMENTS ARE KNOWN TO DEPEND STRONGLY UPON THE MICROSCOPIC CHARACTERISTICS OF THE INDIVIDUAL PARTICLES COMPRISING THE POPULATION. FOR EXAMPLE, PARTICLE SHAPES AND DENSITIES HAVE PRONOUNCED EFFECTS ON THE SETTLING VELOCITIES OF INDIVIDUAL AEROSOLS. ALSO, COAGULATION RATES DUE TO MECHANISMS WHICH PRODUCE RELATIVE MOTIONS BETWEEN PARTICLES WITHIN THE SUSPENDED AEROSOL ARE KNOWN TO DEPEND UPON THE CROSS SECTIONAL AREAS OF THE INDIVIDUAL PARTICLES. HENCE, IT HAS BEEN THE PRIMARY CONCERN OF THIS STUDY TO EXAMINE EXPERIMENTALLY THE MICROSCOPIC CHARACTERISTICS OF SODIUM OXIDE AEROSOLS PRODUCED IN AIR. THE RESULTS OF THESE MEASUREMENTS CAN NOW BE INCORPORATED INTO THE VARIOUS MACROSCOPIC AEROSOL BEHAVIOR PREDICTION MODELS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

AEROSOL + SAMPLING + AGGLOMERATE + THERMOPHORESIS + ANALYTICAL MODEL + REACTOR, LMFBR + OXIDE + SODIUM + HJCK + NRC-7 + JACOBS

B. SOURCES OF ENERGY RELEASE UNDER ACCIDENT CONDITIONS

121639
MEYER RA + HAGEE PW + DURAND RE + DEBEAR WS
U.S. PROGRAM FOR TESTING LARGE SODIUM-WATER REACTION EFFECTS
GENERAL ELECTRIC CO. + ATOMICS INTERNATIONAL
ERDA-76/147/1 +. 30 PPS. PAPER NO. 13. PP. 417-46. PRESENTED AT US/USSR SEMINAR ON PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD, USSR. JULY 26-30, 1976

THE EXPERIMENTAL PROGRAM FOR INVESTIGATING THE EFFECTS OF LARGE SODIUM-WATER REACTIONS (SWR) IN AN LMFBR STEAM GENERATOR IS DISCUSSED. THE STATUS OF THE MAJOR SWR TEST FACILITY, THE LARGE LEAK TEST RIG (LLTR) AND THE ASSOCIATED TEST PROGRAM IS DESCRIBED. ANALYTICAL PREDICTIONS FOR THE INITIAL TEST ARE PRESENTED AND THE RESULTS OF BENCH-TYPE EXPERIMENTS TO SUPPORT THE LARGE LEAK TEST PROGRAM ARE DISCUSSED. THE FACILITY MODIFICATIONS AND TEST ARTICLE DESIGNS FOR THE LARGE PROTOTYPICAL TESTS WHICH WILL FOLLOW THE INITIAL TESTS ARE DESCRIBED ALONG WITH THE PLANNED TESTING PROGRAM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + STEAM GENERATOR + *TESTING + *METAL WATER REACTION + COMPARISON, THEORY AND EXPERIENCE + TEST, LEAK

121642
LANCET RT + MILLS JC + MEYER RA + SANE J + VALENTIN RA
ANALYSIS OF LARGE SODIUM-WATER REACTIONS IN THE UNITED STATES
ATOMICS INTERNATIONAL + GENERAL ELECTRIC CO. + ARGONNE NATIONAL LAB.
ERDA-76/147/1 +. 25 PPS. PAPER NO. 16. PP. 495-520. PRESENTED AT US/USSR SEMINAR ON PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD, USSR. JULY 26-30, 1976

RECENT ADVANCES AND APPLICATIONS OF LARGE SODIUM-WATER REACTION ANALYSIS METHODS ARE PRESENTED. SPECIFIC FEATURES OF THE INTERIM TRANSWRAP-II CODE ARE DISCUSSED AND ILLUSTRATED WITH THE RESULTS OF PARAMETRIC ANALYSES. A DISCUSSION IS PROVIDED COVERING THE SWAAM SERIES OF COMPUTER PROGRAMS, WHICH EMPHASIZE TWO-DIMENSIONAL FLUID AND STRUCTURAL EFFECTS. RESULTS OF COMPUTER ANALYSES OF LARGE SODIUM-WATER REACTIONS IN A STEAM GENERATOR OF THE CLINCH RIVER BREEDER REACTOR PLANT (CRBRP) ARE PRESENTED. RESULTS INCLUDE PREDICTED PRESSURE AND THRUST LOADS THROUGHOUT A STEAM GENERATOR LOOP AND AN ASSOCIATED SODIUM-WATER REACTION PRESSURE RELIEF SUBSYSTEM (SWRPRS) FOR THE DESIGN BASIS LEAK (DBL).

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + STEAM GENERATOR + SODIUM + *METAL WATER REACTION + COMPUTER PROGRAM + CLINCH RIVER (LMFBR) + *THERMAL ANALYSIS + ACCIDENT ANALYSIS

123728
CHAN CK + MIN TK + OKRENT D
A LOOK AT ALTERNATIVE CORE DISRUPTION ACCIDENTS IN LMFBR'S
UNIV. OF CALIF., LOS ANGELES
UCLA-ENG-7720 +. 70 PPS. FEB. 1977

THIS REPORT EXPLORES IN PRELIMINARY FASHION THE COURSE OF A POSTULATED ACCIDENT SCENARIO IN AN LMFBR INVOLVING RUPTURE OF ALL PIPING CONNECTED TO THE REACTOR VESSEL IN THE EVENT OF AN EARTHQUAKE (OR AN EQUIVALENT SCENARIO INVOLVING BOTH LOSS OF HEAT REMOVAL AND SYSTEM RUPTURE). THE CORE IS SUCCESSFULLY SHUT DOWN BUT DECAY HEAT IMPOSES A THREAT TO CORE INTEGRITY. THE ENSUING CALCULATED SEQUENCE OF EVENTS UP TO FUEL MELT, RELOCATION AND POSSIBLE RECRITICALITY IS DESCRIBED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + FUEL MELTDOWN + CORE MELTDOWN + ANALYTICAL MODEL + JACOBS + HJCK + NRC-7

126085
CHAN CK + MIN TK + OKRENT D + CATTON I + KASTENBERG WE
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS
UNIV. OF CALIF., LOS ANGELES
NUREG-0259 +. 65 PPS, 5 TABS, 14 FIGS, 10 REFS, MAY 1977

THIS REPORT EXPLORES IN PRELIMINARY FASHION THE COURSE OF A POSTULATED ACCIDENT SCENARIO IN AN LMFBR INVOLVING RUPTURE OF ALL PIPING CONNECTED TO A REACTOR VESSEL IN THE EVENT OF AN EARTHQUAKE (OR AN EQUIVALENT SCENARIO INVOLVING BOTH LOSS OF HEAT REMOVAL AND SYSTEM RUPTURE). THE CORE IS SUCCESSFULLY SHUT DOWN BUT DECAY HEAT IMPOSES A THREAT TO CORE INTEGRITY. A POSSIBLE ACCIDENT SCENARIO WITH THESE INITIAL CONDITIONS IS PRESENTED, INCLUDING SODIUM VOIDING, CLAD AND FUEL MELDOWN, AND POSSIBLE RECRITICALITY.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

ACCIDENT, CORE DISRUPTIVE + REACTOR, LMFBR + ACCIDENT, LOSS OF COOLANT + DECAY HEAT + FUEL MELTDOWN + CORE MELTDOWN + ACCIDENT ANALYSIS + JACOBS + HJCK + NRC-7

127823

127823 *CONTINUED*
ABRAHAMSON GR + CAGLIOSTRO DJ + FLORENCE AL
TESTS IN SUPPORT OF LMFBR
STANFORD RESEARCH INST., MENLO PARK, CALIF.
15 PPS, 17 FIGS, NUCLEAR ENGINEERING & DESIGN, 42(1), PP. 89-104 (JUNE 1977)

TESTS IN SUPPORT OF LMFBR PROJECTS FOR POTENTIAL INCIDENTS INVOLVING A HYPOTHETICAL CORE DISRUPTIVE ACCIDENT OR SODIUM-WATER INTERACTIONS IN STEAM GENERATORS HAVE TWO POSSIBLE GOALS: (1) TO EVALUATE THE INTEGRITY OF THE PRIMARY CONTAINMENT AFTER THE DESIGN IS FROZEN OR (2) TO INVESTIGATE DESIGN OPTIONS IN SUPPORT OF PRIMARY CONTAINMENT DESIGN. THE FFTF TESTS HAD THE FIRST GOAL. THE CURRENT CRBR TESTS HAVE THE SECOND GOAL. THIS PAPER DISCUSSES TEST PLANNING, SOURCES FOR SIMULATING LOADS, MODELING, AND INSTRUMENTATION. THE MAIN SOURCE DESCRIBED INVOLVES CONTROLLED VENTING OF EXPLOSIVE GASES.

ACCIDENT, CORE DISRUPTIVE + SODIUM + METAL WATER REACTION + *CONTAINMENT INTEGRITY + *CONTAINMENT DESIGN + TESTING + FFTF (TR) + REACTOR, TEST + CLINCH RIVER (LMFBR) + *REACTOR, LMFBR

128320
THEOFANOUS TG + SPEIS TP + DENISE RP
LMFBR ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING
PURDUE UNIV., LAFAYETTE, INDIANA + U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON
CONF-761001(VOL. II) +. 19 PPS, PP. 369-87, FROM PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

THE ROLE OF CORE DISRUPTIVE ACCIDENTS IN THE LICENSING OF LMFBR'S IS ADDRESSED. IN PARTICULAR AS IT RELATES TO THE CRBR. THE EVOLUTION OF THE NRC'S CONTAINMENT DESIGN REQUIREMENTS IS DISCUSSED AND THE TECHNICAL BASIS FOR ITS PRESENT POSITION REVIEWED. THE INITIATORS CONSIDERED FOR ENERGETIC CORE DISRUPTION ARE LOSS-OF-FLOW (LOF) AND TRANSIENT OVERPOWER (TOP) BOTH WITHOUT SCRAM. IN ADDITION TO CONSIDERING THE IMMEDIATE MECHANICAL DISASSEMBLY POTENTIAL FROM THESE INITIATORS, THE POTENTIAL FOR RECRITICALITY DURING MELTDOWN PHASES IS ALSO ASSESSED. THE LOSS-OF-FLOW CASES ARE GIVEN PARTICULAR ATTENTION BECAUSE OF THE APPARENT POTENTIAL FOR SIGNIFICANT ENERGETICS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + CLINCH RIVER (LMFBR) + *ACCIDENT, CORE DISRUPTIVE + *LICENSING PROCESS + ACCIDENT, LOSS OF FLOW + ACCIDENT, CRITICALITY + CORE MELTDOWN

128656
FAUSKE HK
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE ACCIDENTS
ARGONNE NATIONAL LAB., ILL.
11 PPS, 1 TAB, 9 FIGS, 33 REFS, NUCLEAR ENGINEERING & DESIGN, 42(1), PP. 19-29 (JUNE 1977) (FROM SEMINAR HELD IN CONJUNCTION WITH 4TH SMIRT CONF.)

AN ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE ACCIDENTS IS GIVEN WITH EMPHASIS ON THE GENERIC ISSUES OF ENERGETIC RECRITICALITY AND ENERGETIC FUEL-COOLANT INTERACTION EVENTS. APPLICATION OF A FEW GENERAL BEHAVIOR PRINCIPLES TO THE OXIDE-FUELED SYSTEMS SUGGEST THAT SUCH EVENTS ARE HIGHLY UNLIKELY FOLLOWING A POSTULATED CORE MELTDOWN EVENT. THESE GENERAL PRINCIPLES ARE: (1) A SELF-HEATED LIQUID BECOMES DISPERSIVE AND (2) FINE MIXING OF A COLD AND HOT FLUID, A NECESSARY CONDITION FOR DEVELOPING SUSTAINED PRESSURE AND LARGE DAMAGE POTENTIAL FROM THERMAL INTERACTIONS, REQUIRES SPONTANEOUS NUCLEATION ON CONTACT.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + ACCIDENT, CRITICALITY + FUEL COOLANT INTERACTION + ACCIDENT ANALYSIS + SODIUM + URANIUM DIOXIDE

130653
GARDNER PL + ERDMAN CA + REYNOLDS AB
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT
UNIV. OF VA., CHARLOTTESVILLE
NUREG-0344 +. 141 PPS, 8 TABS, 16 FIGS, 51 REFS, OCT. 1977

CONDENSATION OF A PURE, SATURATED VAPOR ONTO A VERTICAL, MELTING SUBSTRATE IS ANALYZED FOR BOTH ONE- AND TWO-MATERIAL SITUATIONS. THE RESULTS OF THIS ANALYSIS HAVE APPLICATIONS IN THE AREA OF LMFBR ACCIDENT ANALYSIS. CONDENSATION OF THE FUEL (A MIXTURE OF URANIUM DIOXIDE AND PLUTONIUM DIOXIDE) ONTO THE ABOVE-CORE STRUCTURE (STEEL) IS A MECHANISM FOR REDUCING THE ENERGY AVAILABLE TO MECHANICALLY DAMAGE THE PRIMARY SYSTEM BOUNDARY. CONDENSATION WILL ALSO ALTER THE RADIOACTIVE AEROSOL SOURCE TERM AVAILABLE FOR POTENTIAL RELEASE FROM THE PRIMARY SYSTEM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + ACCIDENT ANALYSIS + *ACCIDENT, CORE DISRUPTIVE + *CONDENSATION + *VAPOR EXCHANGE + *CONTAINMENT INTEGRITY + MAIN COOLING SYSTEM + FUEL ROD + AEROSOL, RADIOACTIVE + FISSION PRODUCT TRANSPORT + JACOBS + HUCK + NRC-7

9. NUCLEAR INSTRUMENTATION, CONTROL, AND SAFETY SYSTEMS

118919
VAN TILBORG PJ + STINS T
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL
STICHTING REACTOR CENTRUM NEDERLAND, PETTEN, THE NETHERLANDS
RCN-237 +, 27 PPS, 1 TAB, 13 FIGS, 3 REFS, OCT, 1975

A DESCRIPTION IS GIVEN OF INSTRUMENTATION FOR STRESS-RUPTURE TESTING OF TUBES UNDER INTERNAL GAS-PRESSURE LOADING IN A VACUUM ENVIRONMENT. DURING A TEST A TUBE IS HEATED BY AN ELECTRIC CURRENT THROUGH ITS WALL. THIS METHOD ALLOWS VERY HIGH TEST TEMPERATURES AS WELL AS RAPID TEMPERATURE VARIATIONS DURING TESTS. WHEN RAPIDLY CHANGING TEMPERATURES ARE REQUIRED THE TEMPERATURE IS CONTROLLED USING A CHROMEL AND ALUMEL THREAD SPOTWELDED TOGETHER ON THE OUTER SURFACE OF THE TUBE WALL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + FUEL ROD + STRESS RUPTURE + STEEL, STAINLESS + MEASUREMENT, TEMPERATURE + CLADDING

120154
WHITTINGHAM AC
AN EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS
CENTRAL ELECTRICITY GENERATING BOARD, BERKELY, UK
12 PPS, 9 FIGS, 23 REFS, J. NUCLEAR MATERIALS, 60(2), PP. 119-31 (MAY 1976)

A DETAILED STUDY OF THE THERMODYNAMIC AND KINETIC PROPERTIES OF THE LIQUID SODIUM-HYDROGEN SYSTEM HAS BEEN MADE. THE TECHNIQUE EMPLOYED WAS TO MEASURE THE RATE OF ABSORPTION TO EQUILIBRIUM OF SUCCESSIVE HYDROGEN ADDITIONS BY A VIGOROUSLY STIRRED EXCESS OF LIQUID SODIUM (<10 PPM DISSOLVED OXYGEN) IN AN ISOTHERMAL, CONSTANT VOLUME, STAINLESS STEEL (316) REACTION VESSEL IN THE TEMPERATURE RANGE 600-677 K. THE RESULTS HAVE BEEN USED TO ESTIMATE THE VARIATION OF HYDROGEN PRESSURE WITH TIME FOR A GIVEN, STEADY, WATER LEAK RATE INTO THE ARGON GAS BLANKET ABOVE THE LIQUID SODIUM LEVEL IN A SECONDARY HEAT EXCHANGER OF AN LMFBR, AND ALSO TO CALCULATE SOLUTION RATES OF HYDROGEN BUBBLES (FORMED FROM A SODIUM-WATER REACTION UNDER THE LIQUID SODIUM SURFACE) AS A FUNCTION OF INITIAL BUBBLE RADIUS.

REACTOR, LMFBR + LIQUID + SODIUM + WATER + HYDROGEN + LEAK DETECTION + HEAT EXCHANGERS

121630
GREENE DA + SANDUSKY DW
RESULTS OF SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE U.S.
GENERAL ELECTRIC COMPANY
ERDA-76/147/1 +, 27 PPS, PAPER NO. 4, PP. 135-62, PRESENTED AT US/USSR SEMINAR ON PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD, USSR, JULY 26-30, 1976

WHEN A SMALL LEAK OCCURS AND IS DETECTED, THE STEAM GENERATOR SHUTDOWN SEQUENCE MUST BE OPTIMIZED TO PREVENT INTRUSION OF SODIUM INTO THE STEAM SYSTEM OR PLUGGING OF THE LEAK. TESTS WERE PERFORMED USING VARIOUS SHUTDOWN PROCEDURES TO IDENTIFY OPTIMUM CONDITIONS FOR LEAK LOCATION. METHODS TO REOPEN PLUGGED LEAKS WERE ALSO TESTED. SOME OF THE SHUTDOWN PROCEDURES REPEATEDLY PRODUCED OPEN LEAKS WHICH WERE SUBSEQUENTLY LOCATED WITH A HELIUM MASS SPECTROMETER. WASHING WITH CHEMICAL SOLUTIONS SUCCESSFULLY OPENED PLUGGED LEAKS. IT WAS FOUND THAT PULSED EDDY CURRENT AND ULTRASONIC INSPECTION APPEAR PROMISING FOR LEAK LOCATION TECHNIQUES. MORE WORK IS REQUIRED TO TRANSFER SUCH TECHNIQUES FROM THE LABORATORY TO THE OPERATING STEAM GENERATOR.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + STEAM GENERATOR + LEAK + BEHAVIOR + DAMAGE + *LEAK DETECTION + ULTRASONICS + FLOW THEORY AND EXPERIMENTS + TESTING

121634
KOSLOV FA + KUZNETSOV EK + YEGOROV VA
HYDROGEN DETECTOR IN SODIUM
ERDA-76/147/1 +, 23 PPS, PAPER NO. 8, PP. 265-88, PRESENTED AT US/USSR SEMINAR ON PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD, USSR, JULY 26-30, 1976

THE HYDROGEN IN SODIUM DETECTOR DESCRIPTION, THE FUNCTION OF WHICH IS BASED ON USING THE SITUATED IN SODIUM FLOW DIFFUSIONAL MEMBRANE IS GIVEN IN THIS REPORT. THE HYDROGEN WHICH DIFFUSED THROUGH THE MEMBRANE, EVACUATED CONTINUOUSLY BY MEANS OF THE MAGNETIC DISCHARGE TYPE PUMP, THE CONCENTRATION OF HYDROGEN IN SODIUM IS DETERMINED ON THE BASE OF THE DISCHARGE CURRENT. THE HYDROGEN IN SODIUM DETECTOR SENSITIVITY IS ABOUT 5 X 10(EXP -6) % BY WEIGHT AND THE TIME RESPONSE IS ABOUT 30 SEC.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + STEAM GENERATOR + *HYDROGEN + *LEAK DETECTION + SODIUM

121635
SIMMONS WR + EPSTEIN LF + GEPRELS EE + ROY P + BERKEY E + GRUNDY B
HYDROGEN AND OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.
ARGONNE NATIONAL LAB., IL. + GENERAL ELECTRIC CO. + WESTINGHOUSE ELECTRIC CORP.

121635 *CONTINUED*
ERDA-76/147/1 +. 31 PPS. PAPER NO. 9. PP. 289-320. PRESENTED AT US/USSR SEMINAR IN PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD. USSR. JULY 26-20. 1976

THE U.S. EFFORT ON THE DETECTION OF SMALL WATER LEAKS INTO SODIUM-HEATED STEAM GENERATORS HAS CONCENTRATED ON TECHNIQUES FOR OBSERVATION AND MEASUREMENT OF THE REACTOR PRODUCTS IN LIQUID METAL. HYDROGEN METERS CAPABLE OF DETECTING AS LITTLE AS 2 OR 3 PARTS PER BILLION IN SODIUM HAVE BEEN DEVELOPED USING NICKEL MEMBRANES THROUGH WHICH THE H2 CAN PERMEATE. SINCE HYDROGEN IN SODIUM CAN ARISE FROM SOURCES OTHER THAN A WATER LEAK. METERS WHICH CAN DETECT OXYGEN IN SODIUM HAVE ALSO BEEN DEVELOPED. THE EXPERIENCE WITH THESE THREE METER TYPES IS DESCRIBED. AS WELL AS CURRENT LEAK DETECTION STUDIES IN PROGRESS. THE LIMITATIONS AND DEFICIENCIES OF THESE INSTRUMENTS ARE ALSO DISCUSSED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE. U. S. DEPARTMENT OF COMMERCE. SPRINGFIELD. VA. 22161

JACOBS + REACTOR. LMFBR + STEAM GENERATOR + HYDROGEN + OXYGEN + *LEAK DETECTION + *EQUIPMENT DEVELOPMENT

121738
BOGENSBERGER HG
VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF STATE OF OXIDE FUELS FOR FAST REACTOR SAFETY ANALYSIS
GESELLSCHAFT FUR KERNFORSCHUNG. KARLSRUHE. F.R. GERMANY
EURFNR-1361 +. 52 PPS. 5 TABS. 3 FIGS. 26 REFS. MAY 1976

A NEW HIGH-ENERGY LASER TECHNIQUE. INCLUDING FAST TEMPERATURE RECORDING IN THE MICROSECOND RANGE. WAS DEVELOPED FOR MEASURING THE VAPOUR PRESSURE OF FAST BREEDER URANIUM-PLUTONIUM OXIDE FUELS UP TO 7000 K. IN THE TERNARY SYSTEM. THE PRESSURE OF URANIUM-PLUTONIUM OXIDE ABOVE ITS MELTING POINT WAS DETERMINED TO BE LOG P (ATM) = 7.966 - (28137/T). YIELDING A HIGH-TEMPERATURE HEAT OF EVAPORATION OF DELTA H (SUB EVAP) = 128.7 KCAL/MOL. MEASUREMENT OF THE UO2 PARTIAL PRESSURE OVER THE SOLID GAVE LOG P (ATM) = 9.365 - (32436/T). RESULTING IN A HEAT OF SUBLIMATION OF DELTA H (SUB SUB) = 148.4 KCAL/MOL. THE DIFFERENCE OF THESE HEATS YIELDS THE HEAT OF FUSION DELTA H (SUB F) = 19.7 KCAL/MOL. WHICH IS IN GOOD AGREEMENT WITH THE LITERATURE VALUE OF 19.4 KCAL/MOL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE. U. S. DEPARTMENT OF COMMERCE. SPRINGFIELD. VA. 22161

SAFETY ANALYSIS + EQUATION OF STATE + ANALYTICAL TECHNIQUE + LASER + HIGH TEMPERATURE + REACTOR. BREEDER + REACTOR. LMFBR + VAPOR PRESSURE + OXIDE + URANIUM + JACOBS

122559
RUBEL P
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY
OAK RIDGE NATIONAL LABORATORY. TENNESSEE
ORNL/TM-5681 +. 35 PPS. 1 FIG. 29 REFS. MARCH 1977

HUMAN ENGINEERING SOURCE AND APPLICATIONS LITERATURE WAS REVIEWED CRITICALLY TO OBTAIN GUIDANCE FOR FUTURE EFFORTS TO ENHANCE THE OPERABILITY AND MAINTAINABILITY OF THE CLINCH RIVER BREEDER REACTOR PLANT (CRBRP). SELECTED FINDINGS WERE INCORPORATED INTO RECOMMENDATIONS TO APPLY SPECIFIC HUMAN ENGINEERING METHODS AT APPROPRIATE STAGES OF THE CRBRP PROJECT.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER. P.O. BOX 62. OAK RIDGE. TENN. 37830

RELIABILITY ANALYSIS + *RELIABILITY. COMPONENT + *OPERATOR ACTION + CLINCH RIVER (LMFBR) + REACTOR. LMFBR + FAILURE. DESIGN ERROR + FAILURE. OPERATOR ERROR + THEORETICAL INVESTIGATION + JACOBS

123867
KANNON CP
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL CABLES
HANFORD ENGINEERING DEVELOPMENT LAB.. RICHLAND. WASH.
HEDL-TME 76-66 +. 39 PPS. FEB. 1977

MGO INSULATED NUCLEAR INSTRUMENTATION CABLES. DESIGNED FOR USE IN IN-VESSEL LMFBR ENVIRONMENTS. WERE PROCURED USING SPECIAL HEDL/VENDOR DEVELOPED SPECIFICATIONS AND TESTED. THE ULTIMATE GOAL IS OPERATION AT 650 DEG C. 800 VOLTS DIRECT CURRECT (VDC); A KEY INTERMEDIATE GOAL FOR SPECIFIC APPLICATIONS IS OPERATION AT 450 DEG C. 800 VDC. THE CABLES SATISFIED ALL TEST REQUIREMENTS. INCLUDING ABSENCE OF BREAKDOWN PULSE NOISE (BPN). DURING LONG-TERM TESTS (600 HOURS) AT 450 DEG C. 1000 VDC CONTINUOUS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER. P.O. BOX 62. OAK RIDGE. TENN. 37830

JACOBS + *CABLES AND CONNECTORS + INSTRUMENT. NUCLEAR + REACTOR. LMFBR + *TESTING + PERFORMANCE + THERMAL CONSIDERATION + TEST. PROOF + HIGH TEMPERATURE + ELECTRICAL CONDUCTION + INSULATION

124927
DE LORENZO JT + BURNS RS + VALENTINE KH
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS
OAK RIDGE NATIONAL LAB.. TENN.
ORNL/TM-5629 +. 58 PPS. MAY 1977

124927 *CONTINUED*

REMOTE SIGNAL TRANSMISSION OF IN-CORE VARIABLES OF A LIQUID-METAL FAST BREEDER REACTOR IS FEASIBLE WITH PULSE-ECHO (SONAR) TECHNIQUES, FLUIDIC OSCILLATORS, AND IN-CORE ELECTRONIC DEVICES. SOME OF THE MAJOR PROBLEMS ARE THE ACHIEVEMENT OF LINE-OF-SIGHT ACCESS TO THE CORE, DEVELOPMENT OF SODIUM-IMMERSIBLE TRANSDUCERS FOR OPERATION AT HIGH TEMPERATURES (GREATER THAN 1000 DEG F) AND IN A FAST-NEUTRON FLUENCE (GREATER THAN 1 X 10(EXP 18) NVT), DEVELOPMENT OF SPATIAL MULTIPLEXING TO OFFSET A LIMITED NUMBER OF OPERATING FREQUENCIES, AND LOWERING OF THE DEVELOPMENTAL COSTS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*REACTOR, LMFBR + *CORE + *INSTRUMENT, SURVEILLANCE + HIGH TEMPERATURE + INSTRUMENT, FLUIDICS + OSCILLATION + ELECTRONIC FUNCTION UNITS + JACOBS

126416
ANDERSON TT + GAVIN AP + BOBIS JP
IRRADIATION OF MICROPHONES IN THE EBR-II CORE
ARGONNE NATIONAL LAB., ILL.
ANL-CT-76-20 +. 109 PPS, 6 TABS, 30 FIGS, 5 REFS, JUNE 1976

SIX ANL DEVELOPED HIGH TEMPERATURE MICROPHONE (ACOUSTIC DETECTORS) HAVE BEEN EXPOSED IN FLOWING SODIUM IN THE IN-CORE INSTRUMENT TEST FACILITY (INCOT) IN EBR-II FOR 7 MONTHS WITHOUT ANY INDICATIONS OF SERIOUS DEGRADATION OF SIGNAL OUTPUT DUE TO THE EXPOSURE. THE YY05 EXPERIMENT (EBR-II INCOT EXPERIMENT DESIGNATION) WAS PERFORMED TO OBTAIN DATA WHICH WOULD BE USEFUL IN EVALUATING THE ABILITY OF THE MICROPHONES WHOSE ACTIVE ELEMENTS ARE LITHIUM NIOBATE TO SERVE AS SENSORS FOR ACOUSTIC SURVEILLANCE OF FAST BREEDER REACTORS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

ANL + R AND D PROGRAM + *NOISE ANALYSIS + ACOUSTICS + REACTOR, LMFBR + *EBR 1 AND 2 (HE) + REACTOR, TEST + IRRADIATION TESTING

127647
RUPPERT E + VINZENS K + STEHLE H
UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-CORE INSTRUMENTATION
INTERATOM, BENSBERG, F.R. GERMANY
7 PPS, 17 FIGS, 7 REFS, ATOMKERNENERGIE, 29(3), PP. 176-82 (MARCH 1977)

A SODIUM TEST FACILITY FOR FAST BREEDER CORE COMPONENTS (AKB), BUILT BY INTERATOM AT BENSBERG, HAS BEEN OPERATING SINCE 1971 TO TEST FUEL DUMMIES AND BLANKET ELEMENTS AS WELL AS ABSORBER ELEMENTS UNDER SIMULATED NORMAL AND EXTREME REACTOR CONDITIONS. INDIVIDUAL FULL-SCALE FUEL OR BLANKET ELEMENTS AND ARRAYS OF SEVEN ELEMENTS, MODELLING A SECTION OF THE SNR-300 REACTOR CORE, HAVE BEEN TESTED UNDER A WIDE RANGE OF SODIUM MASS FLOW AND ISOTHERMAL TEST CONDITIONS UP TO 925 K AS WELL AS UNDER CYCLIC CHANGED TEMPERATURE TRANSIENTS. BESIDES ENDURANCE TESTING OF THE CORE COMPONENTS A SPECIAL SODIUM AND HIGH-TEMPERATURE INSTRUMENTATION IS PROVIDED TO INVESTIGATE THERMOHYDRAULIC AND VIBRATIONAL BEHAVIOUR OF THE TEST OBJECTS. DURING ALL TEST PERIODS THE MAIN SUBASSEMBLY CHARACTERISTICS COULD BE REPRODUCED AND THE RELIABILITY OF THE INSTRUMENTATION COULD BE PROVEN.

SODIUM + TESTING + REACTOR, LMFBR + GERMANY + REACTOR TEST FACILITY + VIBRATION + *CORE COMPONENTS + MEASUREMENT + *INSTRUMENT, IN CORE

128334
SPENNER + PASCHALL RK + MARQUETTE M
HYDRAULICALLY SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR'S
ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.
CONF-761001(VOL. II) +. 13 PPS, PP. 683-95, FROM PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

A DIVERSE, INHERENTLY-ACTUATED CONTROL SYSTEM WOULD BE VERY VALUABLE FOR ADVANCED LMFBR'S SINCE ITS USE MAY PRECLUDE THE CONSIDERATION OF A "HYPOTHETICAL CORE DISRUPTIVE ACCIDENT" AS A DESIGN BASIS. AN INHERENT SHUTDOWN SYSTEM WHICH USES A NUMBER OF SUBASSEMBLIES, EACH CONTAINING A COLUMN OF HYDRAULICALLY SUPPORTED TANTALUM BALLS, IS BEING STUDIED. THIS SYSTEM APPEARS TO BE CAPABLE OF SUCCESSFULLY PROTECTING THE PUBLIC (AND THE REACTOR) FROM LOW-PROBABILITY HIGH-CONSEQUENCE EVENTS, SUCH AS A LOSS-OF-FLOW OR TRANSIENT-OVER-POWER INCIDENT WITH FAILURE OF THE NORMAL CONTROL SYSTEM (OR SYSTEMS) TO SCRAM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + SHUTDOWN MECHANISM, SELF + PROTECTION SYSTEM + *SHUTDOWN SYSTEM, SECONDARY

128969
SOWA ES + BARTHOLD WP + EGGEN DT
LMFBR SELF-ACTIVATED SHUTDOWN SYSTEMS
ARGONNE NATIONAL LAB., ILL.
CONF-761001-45 +. 11 PPS, FROM INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 1976

SELF-ACTUATED SHUTDOWN SYSTEMS, FULLY CONTAINED WITHIN THE DIMENSIONS OF A FUEL SUBASSEMBLY AND INSTALLED IN THE CORE IN JUDIOUSLY CHOSEN LOCATIONS, CAN PROVIDE AN IMPORTANT ADDITIONAL SAFETY

128969 *CONTINUED*
FEATURE FOR LMFBRS. IF ACTUATED BY PHENOMENA INHERENT TO THE SYSTEM AND ITS IMMEDIATE ENVIRONMENT, THESE SYSTEMS CAN CONTRIBUTE CONSIDERABLY TO THE TOTAL RELIABILITY OF THE OVERALL PLANT PROTECTION SYSTEM. IN PARTICULAR AS REGARDS PROTECTIN AGAINST HUMAN ERROR. THIS TYPE OF SHUTDOWN SYSTEM IS CAPABLE OF INSERTING A SUBSTANTIAL AMOUNT OF NEGATIVE REACTIVITY INTO THE CORE WITH A RELATIVELY SMALL IMPACT ON PLANT PERFORMANCE.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + PROTECTION SYSTEM + *SHUTDOWN MECHANISM, SELF + SHUTDOWN SYSTEM, SECONDARY + INSTRUMENT, IN CORE

129239
MUTTER E + TUNA LA
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR
U.S. PATENT 4,028,8[illegible] +, JUNE 14, 1977

THIS PATENT RELATES TO SPRING-LOADED PLUNGERS WHICH ARE ARRANGED ABOUT A HOUSING FOR INSERTION INTO A POLYGONAL TUBE, ONE PLUNGER FOR EACH SIDE OF THE TUBE. EACH PLUNGER HAS A LOCKING CAM AND SLIDING WEDGE MECHANISM WHICH CAN OVERCOME THE SPRING FORCE ASSOCIATED WITH THE PLUNGER AND LOCK IT IN ANY POSITION. THE WEDGES ARE OPERATED BY A ROD MOVABLE AXIALLY IN THE HOUSING.

AVAILABILITY - THE U.S. PATENT OFFICE, DEPT. OF COMMERCE, WASHINGTON, D.C.

UNITED STATES + PATENT + REACTOR, LMFBR + MEASUREMENT + *INSTRUMENT, LIQUID LEVEL

10. ELECTRICAL POWER SYSTEMS

122043
ECKER JEB
FFTF ELECTRICAL SYSTEM RELIABILITY STUDY
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 76-50 +. 226 PPS. 14 TABS. 11 FIGS. AUG. 1976

SIX FAILURE EVENTS WERE SPECIFICALLY STUDIED -- THESE INCLUDED AN ASSESSMENT OF THE EXPECTED NUMBER OF TIMES THE FFTF WOULD BE UNAVAILABLE FOR OPERATION DUE TO FAILURES IN THE ELECTRICAL SYSTEM, AS WELL AS EVALUATIONS OF THE EXPECTED NUMBER OF OCCURRENCES OF A LOSS OF ELECTRICAL POWER TO VARIOUS GROUPS OF CRITICAL COMPONENTS IN THE FFTF. THE GROUPS OF CRITICAL COMPONENTS IN THE EVALUATION ARE THE EMERGENCY POWER SYSTEM, THE ZTO SYSTEM, THE MAIN CHILLER COMPONENTS, THE PRIMARY AND SECONDARY CRDM MG SETS AND THE PRIMARY SODIUM PUMPS IN THE HEAT TRANSPORT SYSTEM. IN THE COURSE OF EVALUATING THE SYSTEM RELIABILITY, SEVERAL COMPONENTS THAT DO CONTRIBUTE SIGNIFICANTLY TO THE PROBABILITY OF SYSTEM FAILURE WERE IDENTIFIED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

JACOBS + RELIABILITY ANALYSIS + *RELIABILITY, SYSTEM + FAULT TREE ANALYSIS + ELECTRIC POWER + ELECTRIC POWER, ALTERNATE + ELECTRIC POWER, AUXILIARY + ELECTRIC POWER, NORMAL + ELECTRIC POWER, SHUTDOWN + ELECTRIC POWER, UNINTERRUPTED + ELECTRIC POWER, VITAL + EMERGENCY POWER, ELECTRIC + FAILURE, EQUIPMENT + PROBABILITY + *FFTF (TR) + REACTOR, LMFBR

124318
AITKEN A
ASSESSMENT OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER
UKAEA SAFETY & RELIABILITY DIRECTORATE, UK
6 PPS. 4 FIGS. 4 REF. NUCLEAR SAFETY, 18(2), PP. 168-73 (MARCH-APRIL 1977)

THIS ARTICLE OUTLINES THE PROBLEM AND THE PROBLEM AREAS AS OBSERVED IN A RECENT ASSESSMENT OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR THE PROTOTYPE FAST REACTOR, A LIQUID-METAL-COOLED FAST BREEDER REACTOR AT DOUNREAY. TARGETS FOR RELIABILITY IN INDIVIDUAL MEASUREMENTS, SAFETY CIRCUITS, AND SHUTDOWN DEVICES ARE DETERMINED BY RELIABILITY APPORTIONMENT WITHIN THE DIVERSE SYSTEM THAT WAS DESIGNED TO MEET WELL-RECOGNIZED BASIC PRECEPTS. SOME COMMENTS ARE MADE ON OPERATING EXPERIENCE IN RELATION TO THE HIGH REQUIREMENTS.

REACTOR, LMFBR + UNITED KINGDOM + PFR (LMFR) + *REACTOR PROTECTION SYSTEM + RELIABILITY ANALYSIS + *RELIABILITY, SYSTEM + ACCIDENT, LOSS OF POWER

11. CONTAINMENT OF NUCLEAR FACILITIES

120090
GRINKMAN CR + SIKKA VK + KING RT
MECHANICAL PROPERTIES OF LMFBR PRIMARY PIPING MATERIALS
OAK RIDGE NATIONAL LABORATORY, TENNESSEE
ORNL-5199 +. 48 PPS. 15 FIGS. 84 REFS. NOV. 1976

A REVIEW IS PRESENTED OF THE AVAILABLE TENSILE, CREEP-RUPTURE, FATIGUE, CREEP-FATIGUE, AND TOUGHNESS PROPERTIES OF RELEVANT PRODUCT FORMS OF TYPES 316 AND 304 STAINLESS STEEL AND ASSOCIATED AS-DEPOSITED WELD METALS TYPES 308, 16-8-2 AND 316. SINCE TYPE 316 STAINLESS STEEL AND ITS WELDMENTS IN HOT-LEG PIPING APPLICATIONS MUST OPERATE AT TEMPERATURES WITHIN THE CREEP RANGE, A DESCRIPTION OF BOTH TIME-DEPENDENT AND TIME-INDEPENDENT BEHAVIOR IS EMPHASIZED FOR THIS MATERIAL. TENSILE YIELDS AND ULTIMATE STRENGTHS, AS WELL AS CREEP-RUPTURE STRENGTHS OF TUBE, PIPE, AND PLATE PRODUCT FORMS IN THE AS-RECEIVED OR MILL-ANNEALED CONDITION, WERE GENERALLY ABOVE ASME CODE OR NUCLEAR SYSTEMS MATERIALS (NSM) HANDBOOK MINIMUM TREND CURVES.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

PROPERTY, MECHANICAL + REACTOR, LMFBR + STEEL, STAINLESS + WELDING + PIPES AND PIPE FITTINGS + TENSILE PROPERTY + FATIGUE + CREEP + FRACTURE TOUGHNESS + JACOBS

120378
KAWAGUCHI O + ANDO Y + MATSUMURA M + TAKEI A
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR "MONJU" SCALE MODELS
POWER REACTOR & NUCLEAR FUEL DEVELOPMENT CORP., TOKYO, JAPAN + UNIV. OF TOKYO, JAPAN
21 PPS. 7 TABS. 12 FIGS. 3 REFS. NUCLEAR ENGINEERING & DESIGN, 38(1), PP. 109-29 (JULY 1976)

PRESENTS SOME RESULTS OF EXPERIMENTS WHICH SIMULATE THE STRUCTURAL DYNAMIC RESPONSE OF A LMFBR PRIMARY COOLANT BOUNDARY TO A HYPOTHETICAL CORE DISRUPTIVE ACCIDENT (HCDA) BASED ON SCALE MODELS AND HIGH EXPLOSIVES. IT WAS NOTED THAT HIGH EXPLOSIVES ARE NO LONGER A GOOD SIMULANT OF THE HCDA. HOWEVER, THE MAIN PURPOSE OF THE PROGRAM, WHICH INCLUDED THIS EXPERIMENT, IS NOT TO EXPERIMENTALLY PREDICT THE DYNAMIC RESPONSE OF THE REACTOR STRUCTURE AT THE HCDA, BUT TO VALIDATE COMPUTER CODES, WHICH DESCRIBE THE PRESSURE WAVE PROPAGATION AND DAMAGE PROCESS IN THE REACTOR STRUCTURES, USING THE DATA OBTAINED FROM THESE MODEL EXPERIMENTS.

REACTOR, LMFBR + ACCIDENT, HYPOTHETICAL + ACCIDENT, CORE DISRUPTIVE + EXPLOSIVE, CONVENTIONAL + COMPUTER PROGRAM + MODEL TESTING + CONTAINMENT + PRESSURE PULSE + SHOCK WAVE + PRESSURE VESSELS

120629
FISTEDIS SH
STRUCTURAL RESPONSE OF FAST BREEDER REACTORS TO HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS
ARGONNE NATIONAL LABORATORY, ILLINOIS
13 PPS. 8 FIGS. 32 REFS. NUCLEAR ENGINEERING & DESIGN, 38(1), PP. 43-54 (JULY 1976)

SINCE THE BEGINNING OF LIQUID METAL-COOLED FAST BREEDER REACTOR (LMFBR) DEVELOPMENT, EFFORTS HAVE BEEN MADE TO GAGE THE STRUCTURAL RESPONSE OF THE CORE COMPONENTS, THE PRIMARY AND SECONDARY SYSTEM COMPONENTS, AND THE CONTAINMENT TO THE EFFECTS OF HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS (HCDAS). THE EFFORT RESULTED IN THE SYSTEMATIC DEVELOPMENT OF ANALYSES AND CODES, AND THE PERFORMANCE OF CONFIRMATORY EXPERIMENTS. GRADUALLY, AN ORGANIZED BODY OF KNOWLEDGE DEVELOPED IN THIS SECTOR OF TECHNOLOGY. THIS PAPER BRIEFLY DESCRIBES (1) THE PROBLEMS INVOLVED IN THE EVALUATION OF THE RESPONSE OF THE LMFBR TO HCDAS; (2) THE CURRENTLY AVAILABLE ANALYTICAL TOOLS AND EXTENT OF THEIR CONFIRMATION; AND (3) THE REMAINING AREAS OF FURTHER DEVELOPMENT NEEDED.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + COMPONENTS + ANALYTICAL MODEL + RESPONSE TIME + COMPUTER PROGRAM

121641
KRUGER GB + MURDOCK TB + SANE JO + RODWELL E
DESIGN OF THE US-CRBRP SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM
GENERAL ELECTRIC CO. + WESTINGHOUSE ELECTRIC CORP.
ERDA-76/147/1 +. 24 PPS. PAPER NO. 15, PP. 471-94. PRESENTED AT US/USSR SEMINAR ON PROBLEMS OF RELIABILITY & SAFE OPERATION OF LMFBR STEAM GENERATORS; DIMITROVGRAD, USSR, JULY 26-30, 1976

PROTECTION AGAINST INTERMEDIATE SODIUM SYSTEM OVERPRESSURE FROM THE SODIUM/WATER REACTION ASSOCIATED WITH LARGE LEAKS WITHIN THE CRBRP STEAM GENERATORS IS PROVIDED BY THE SODIUM/WATER REACTION PRESSURE RELIEF SYSTEM (SWRPRS). THIS SYSTEM CONSISTS OF RUPTURE DISKS CONNECTED TO THE INTERMEDIATE SODIUM PIPING ADJACENT TO THE INLET TO THE SUPERHEATER AND OUTLET FROM THE EVAPORATOR MODULES. THE RUPTURE DISCS RELIEVE INTO PIPING THAT LEADS TO REACTION PRODUCT SEPARATOR TANKS, WHICH IN TURN ARE VENTED TO A CENTRIFUGAL SEPARATOR AND FLARE STACK ARRANGED TO BURN HYDROGEN GAS EXHAUSTING INTO THE ATMOSPHERE. ANALYSES HAVE BEEN CONDUCTED USING THE TRANSWRAP COMPUTER CODE TO PREDICT THE SYSTEM PRESSURES AND FLOW RATES DURING THE LARGE LEAK EVENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + STEAM GENERATOR + *METAL WATER REACTION + *PRESSURE RELIEF + SODIUM + CLINCH RIVER (LMFBR) + COMPUTER PROGRAM + *THERMAL ANALYSIS

121729

121729 *CONTINUED*
GLUEKLER EL
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEAP-14121 +, 53 PPS, 3 TABS, 27 FIGS, 19 REFS, AUG. 1976

THE SELECTION OF AN EXVESSEL POST-ACCIDENT HEAT REMOVAL AND CORE RETENTION CONCEPT IS DESCRIBED. A CRUCIBLE SYSTEM WITH ACTIVE HEAT REMOVAL SYSTEM SEEMED THE MOST PROMISING. THE CRUCIBLE CONCEPT IS DESCRIBED IN DETAIL AND SCOPING ANALYSES ADDRESSING THE THERMAL AND STRUCTURAL PERFORMANCE OF THE SYSTEM ARE PRESENTED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION: SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*CORE CATCHER + REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + CORE MELTDOWN + THERMAL ANALYSIS + PERFORMANCE + JACOBS + SODIUM + ACCIDENT, HYPOTHETICAL

121754
CALAK AF + NOBLES RG + BUSCHMAN HW
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE SEALS - 1969-1975
ARGONNE NATIONAL LABORATORY, ILLINOIS
ANL-75-10 +, 66 PPS, 7 TABS, 37 FIGS, MARCH 1976

THE EBR-II ROTATING-PLUG FREEZE SEALS HAVE CONTINUED TO FULFILL THE DESIGN REQUIREMENTS OF ACTING AS A BLANKET-GAS SEAL WHILE PROVIDING A SOLID MECHANICAL SEAL DURING REACTOR POWER RUNS AND A MOVABLE LIQUID SEAL DURING FUEL HANDLING. OPERATION OF THE SEALS HAS NOT BEEN TROUBLE-FREE, AND MODIFICATIONS WERE MADE TO IMPROVE OPERATION AND MAINTENANCE. SINCE 1969, EXTENSIVE CHANGES WERE MADE IN THE TEMPERATURE CONTROL OF THE SEALS IN ORDER TO REDUCE THE MAINTENANCE EFFORT AND IMPROVE THE OPERATIONAL CHARACTERISTICS OF THE SYSTEM.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION: SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

JACOBS + *OPERATING EXPERIENCE SUMMARY + *SEAL + EBR 1 AND 2 (RE) + REACTOR, LMFBR + MODIFICATION + MAINTENANCE AND REPAIR + ANL

122592
GROSBERG AJ
LMFBR FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE FRUMP
IMPERIAL COLLEGE, LONDON, ENGLAND
3 PPS, 6 FIGS, J. INST. NUCL. ENGRS., 17(5), PP. 120-22 (OCT. 1976)

FUEL TO CLADDING GAP, FUEL CENTER TEMPERATURE, AND HOOP STRESS ARE CALCULATED FOR FOUR POWER RATINGS (350, 250, 150 AND 50 W/G) AND THREE OUTER CLAD TEMPERATURES (673, 823 AND 973K). GAP CLOSURE IS DUE PRIMARILY TO FUEL SWELLING. FUEL CENTER TEMPERATURE DEPENDS ON GAP CONDUCTANCE AND THE THERMAL RESISTANCE OF THE FUEL. HOOP STRESS IN THE CLAD EXHIBITS THREE WELL DEFINED VARIATIONS.

REACTOR, LMFBR + *FUEL ROD + COMPUTER PROGRAM + TEMPERATURE + CLADDING + FUEL SWELLING + HEAT CONDUCTANCE, FUEL TO CLAD + STRESS + THERMAL MECHANICAL EFFECT

123913
DIERCKS DR + RASKE DT
ELEVATED-TEMPERATURE, STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL ANALYSIS
ARGONNE NATIONAL LAB., ILL.
ANL-76-95 +, 63 PPS, DEC. 1976

IN THE PAST DECADE, A CONSIDERABLE QUANTITY OF ELEVATED-TEMPERATURE (430 DEG C (806 DEG F) AND ABOVE) LOW-CYCLE FATIGUE DATA HAVE BEEN OBTAINED ON AISI TYPE 304 STAINLESS STEEL. MOST OF THESE DATA WERE OBTAINED IN SUPPORT OF THE STRUCTURAL DESIGN OF THE LIQUID-METAL FAST-BREEDER REACTOR. THE PRESENT REPORT DESCRIBES THE RESULTS OF AN EXTENSIVE EFFORT TO COLLECT THE APPROPRIATE DATA. ANALYTICALLY DESCRIBES THE OBSERVED EFFORT TO COLLECT THE LIFE AS A FUNCTION OF THE PRINCIPAL TEST VARIABLES, AND MAKES STATISTICAL INFERENCES CONCERNING THE SIGNIFICANCE OF TEST VARIABLES NOT INCLUDED IN THE REGRESSION MODEL.

AVAILABILITY - LIMITAVIONS ON DISTRIBUTION: SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

JACOBS + ANALYTICAL MODEL + HIGH TEMPERATURE + STEEL, STAINLESS + FATIGUE + REACTOR, LMFBR + STATISTICAL ANALYSIS

126597
KESSLER G + PAPP R + HUBEL D
SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL CYCLE
KERNFORSCHUNGSZENTRUM KARLSRUHE + INTERATOM, BENSBERG, F.R. GERMANY
IAEA-CN-36/572 +, 12 PPS, FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

124597 *CONTINUED*
THE STATUS AND THE WHOLE SPECTRUM OF SAFETY DESIGN FEATURES FOR KNK-II AND SNR-300 WERE ALREADY DESCRIBED IN EARLIER PAPERS. THIS PAPER THEREFORE CONCENTRATES ON THE MAIN IMPORTANT AREAS OF THE SAFETY CHARACTERISTICS OF SNR-300 AND PUTS THEM INTO PERSPECTIVE WITH GENERAL SAFETY DESIGN CRITERIA FOR COMMERCIAL POWER REACTORS IN THE FRG. THE FOLLOWING MAIN AREAS WILL BE DISCUSSED: (1) PROTECTION AGAINST EXTERNAL EVENTS; (2) RELIABILITY OF DECAY HEAT REMOVAL; AND (3) PROTECTION AGAINST INTERNAL EVENTS: THE HYPOTHETICAL CORE DISASSEMBLY ACCIDENT AND THE CONTAINMENT CONCEPT.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*REACTOR, LMFBR + *FUEL CYCLE + GERMANY + *SAFETY EVALUATION + ACCIDENT, HYPOTHETICAL + ACCIDENT, CORE DISRUPTIVE + DECAY HEAT

124743
SMIRE PR
SPRAY CODE USER'S REPORT
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 76-94 +. 126 PPS. 8 TABS. 21 FIGS. 42 REFS. MARCH 1977

THE SPRAY COMPUTER CODE WAS DEVELOPED TO MODEL THE EFFECTS OF POSTULATED SODIUM SPRAY RELEASE FROM LMFBR PIPING WITHIN CONTAINMENT CHAMBERS. THE CALCULATION METHOD UTILIZES GAS CONVECTION, HEAT TRANSFER AND DROPLET COMBUSTION THEORY TO CALCULATE THE PRESSURE AND TEMPERATURE EFFECTS WITHIN THE ENCLOSURE. THE APPLICABLE RANGE IS 0-21 MOL % OXYGEN AND .02-.30 INCH DROPLETS WITH OR WITHOUT HUMIDITY. DROPLET MOTION AND LARGE SODIUM SURFACE AREA COMBINE TO PRODUCE RAPID HEAT RELEASE AND PRESSURE RISE WITHIN THE ENCLOSED VOLUME.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*SPRAY + COMPARTMENT + SODIUM + REACTOR, LMFBR + DROPLET + PIPES AND PIPE FITTINGS + LEAK + COMPUTER PROGRAM + PRESSURE TRANSIENT

125285
SLAUGHTER GM + EDMONDS DP + GOODWIN GM
WELDING DEVELOPMENT FOR LMFBR APPLICATIONS
OAK RIDGE NATIONAL LAB., TENN.
CONF-761026-2 +. 18 PPS. FROM MEETING OF IMOG SUBGROUP ON GAGING; LIVERMORE, CALIF., OCT. 5, 1976

AUSTENITIC STAINLESS STEELS ARE THE MATERIALS OF CONSTRUCTION FOR VESSELS, PIPING, AND OTHER COMPONENTS FOR LMFBRS. MANY OF THESE COMPONENTS ARE OF WELDED CONSTRUCTION AND ARE, OR WILL BE, USED IN SERVICE AT ELEVATED TEMPERATURES. VERY LITTLE DATA HAVE BEEN GENERATED CONCERNING THE HIGH-TEMPERATURE CREEP PROPERTIES; ALSO THE LIMITED DATA AVAILABLE SHOW A HIGH DEGREE OF SCATTER, ESPECIALLY IN CREEP DUCTILITY. AS A RESULT OF THE LOW CREEP DUCTILITY AND THE OBVIOUS NEEDS FOR IMPROVED FILLER METALS AND DATA FOR HIGH-TEMPERATURE DESIGN, AN EXTENSIVE STAINLESS STEEL WELDING STUDY IS BEING CONDUCTED. SEVERAL PROGRAMS ARE ACTIVELY UNDERWAY AT ORNL AND SELECTED PORTIONS OF THREE OF THESE PROGRAMS ARE DISCUSSED BRIEFLY IN THIS PAPER.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + STEEL, STAINLESS + WELDING + HIGH TEMPERATURE + CREEP

126529
WRONA BJ + ROBERTS JA + HIGGINS GT
MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT HEATING
ARGONNE NATIONAL LAB., ILL. + ILL. INST. OF TECHNOLOGY, CHICAGO
14 PPS, 2 TABS, 25 FIGS, 21 REFS. NUCLEAR TECHNOLOGY, 32(3), PP. 276-89 (MARCH 1977)

A DIRECT-ELECTRICAL-HEATING APPARATUS WAS UTILIZED TO PERFORM FUNDAMENTAL EXPERIMENTS ON SHORT, UNIRRADIATED, UNCLAD UO2 PELLET STACKS TO INVESTIGATE THE EFFECT OF VARYING THE ENERGY-DEPOSITION RATE AND ENERGY LEVEL ON THE MECHANICAL RESPONSE OF THE FUEL TO TRANSIENT HEATING. RESULTS SHOW THAT AS THE RATE OF ENERGY INPUT TO THE UO2 PELLET STACKS INCREASES, (A) THE ENERGY FAILURE THRESHOLD DECREASES AND (B) THE AREAL MELT FRACTION AND FAILURE DECREASES. TWO SIGNIFICANTLY DIFFERENT REGIMES OF FUEL-MOTION BEHAVIOR WERE OBSERVED ABOVE AND BELOW A THRESHOLD DESIGNATED AS THE THRESHOLD OF GROSS FUEL MOTION. ABOVE THE THRESHOLD, THIS MOTION OCCURS BY MOLTEN FUEL RELEASE. BELOW THE THRESHOLD, FUEL DEFORMS PLASTICALLY BY A CREEP MECHANISM.

REACTOR, LMFBR + URANIUM DIOXIDE + THERMAL TRANSIENT + FUEL MELTDOWN + CORE MELTDOWN + OUT OF PILE EXPERIMENT + PROPERTY, MECHANICAL + THERMAL PROPERTY + ANL + TREAT (PRR)

127472
MCAFEE WJ + RICHARDSON M + SARTORY WK
CREEP DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS STEEL STRUCTURAL WELDMENTS
OAK RIDGE NATIONAL LAB., TENN.
ORNL-5265 +. 152 PPS. REFS. JUNE 1977

THE CREEP DEFORMATION AND RUPTURE OF TYPE 304/308 STAINLESS STEEL STRUCTURAL WELDMENTS AT 593 C WAS EXPERIMENTALLY INVESTIGATED TO STUDY THE COMPARATIVE BEHAVIOR OF THE BASE METAL AND WELD METAL CONSTITUENTS. THE TESTS WERE CONDUCTED IN SUPPORT OF ORNL'S PROGRAM TO DEVELOP HIGH-TEMPERATURE STRUCTURAL DESIGN METHODS APPLICABLE TO LMFBR SYSTEM COMPONENTS THAT OPERATE IN THE CREEP RANGE. RESULTS ARE PRESENTED ON THE COMPARATIVE DEFORMATION AND RUPTURE BEHAVIOR OF

127472 *CONTINUED*
SELECTED POINTS IN THE BASE METAL AND WELDMENT REGIONS OF THE DIFFERENT SPECIMENS AND ON THE OVERALL SURFACE STRAINS FOR SELECTED SPECIMENS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

ORNL + R AND D PROGRAM + *CREEP + *DEFORMATION + CREEP BEHAVIOR + *STEEL, STAINLESS + *WELDS + HIGH TEMPERATURE + STRUCTURAL INTEGRITY + REACTOR, LMFBR + STRUCTURAL ANALYSIS, DYNAMIC + JACOBS

127484
A COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO STEEL
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEFR-00059 +, 80 PPS, 8 TABS, 22 FIGS, DEC. 1976

WITHIN DOCUMENTS PERTINENT TO THE DESIGN OF CRBR, THERE EXIST 2 DISTINCT TABULATIONS OF DATA WHICH REPORTEDLY DEFINE THE LOWER LIMIT OF THE STRESS REQUIRED FOR CREEP RUPTURE OF ANNEALED 2.25 CR-1MO STEEL ALLOY. THESE TABULATIONS ARE FOUND WITHIN TABLE 1-14.AD OF CODE CASE 1592 AND TABLE 3 OF PROPERTY CODE 2202 OF THE NUCLEAR SYSTEMS MATERIALS HANDBOOK (NSMH). THESE TABULATIONS ARE BASED ON THE SAME RUPTURE CRITERION, AND YET THEY ARE NOT EQUIVALENT. METHODS USED TO DETERMINE THE VALUES OF STRESS RUPTURE MINIMUM REPORTED IN CODE CASE 1592 AND NSMH ARE COMPARED. THIS REPORT ADDRESSES THE DIFFERENCE IN THE VALUES AND WHICH TABULATION TO BE USED IN THE CRBR DESIGN.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*COMPARISON + CODES AND STANDARDS + NUMERICAL METHOD + *STRESS RUPTURE + HEAT TREATMENT + *STEEL + ALLOY + CLINCH RIVER (LMFBR) + REACTOR, LMFBR + GENERAL ELECTRIC + R AND D PROGRAM + JACOBS

127504
EXECUTIVE SUMMARY - NEEDS FOR ENERGY-RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME I - NEAR-TERM ENERGY PROGRAM
FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING & TECHNOLOGY
NP-21665 +, 8 PPS, 1 TAB, 1977

IN THIS REPORT, THE PRIORITIES FOR MATERIALS R & D NEEDED TO MEET THE OBJECTIVES OF THE NATIONAL ENERGY PLAN ARE PRESENTED. THE PRINCIPAL NEAR-TERM OBJECTIVE IN LWR TECHNOLOGY IS TO ASSIST INDUSTRY IN ACHIEVING HIGH LEVELS OF RELIABILITY, AVAILABILITY, AND CAPACITY. IMPORTANT R & D NEEDS IN LWR TECHNOLOGY ARE TO REDUCE THE SUSCEPTIBILITY TO STRESS CORROSION CRACKING IN COMPONENTS AND SUPPRESS THE FUEL-CLADDING INTERFACE REACTION. IN BREEDER REACTORS, R & D TO IMPROVE FUEL ELEMENTS AND HEAT-EXCHANGER MATERIALS IS NEEDED.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REVIEW + *MATERIAL + REACTOR, LWR + REACTOR, LMFBR + STRESS CORROSION + COMPONENTS + *R AND D PROGRAM + JACOBS + CRACK

127583
CHANG ALJ + BARON IM + BLEIBERG ML
CHARACTERIZATION AND AGING KINETICS STUDY OF GAMMA PRIME ALLOYS FOR BREEDER REACTORS
WESTINGHOUSE ELECTRIC CORP., MADISON, PA.
WARD-AD-3065-5 +, 77 PPS, 10 TABS, 38 FIGS, JULY 1977

A SERIES OF FE-CR-NI BASED GAMMA PRIME STRENGTHENED AUSTENTIC ALLOYS WERE CHARACTERIZED OPTICALLY AND BY TRANSMISSION ELECTRON MICROSCOPY. A UNIFORM DISPERSION OF SPHERICAL GAMMA PRIME PARTICLES WAS OBSERVED TO BE THE MAJOR PRECIPITATED PHASE THROUGHOUT THE MATRIX. LONG TERM AGING EXPERIMENTS SHOWED PHASE STABILITY IN THESE ALLOYS. THE GAMMA PRIME AGING KINETIC DATA OF AVERAGE PARTICLE RADIUS, GAMMA PRIME VOLUME FRACTION AND GAMMA PRIME PARTICLE CONCENTRATION WERE ANALYZED IN TERMS OF A NEW PARTICLE COARSENING THEORY WHICH ACCOUNTS FOR INCREASING VOLUME FRACTION AND REDUCES TO THE LIFTSHITZ-SLYOZOV-WAGNER (L-S-W) RESULT IN THE ASYMPTOTIC LIMIT.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

WESTINGHOUSE + R AND D PROGRAM + *REACTOR, BREEDER + *CYCLING + IRON + CHROMIUM + NICKEL + GAMMA + *ALLOY + ELECTRON MICROSCOPY + PRECIPITATION + JACOBS

127586
BEGLEY JA + SHEINKER AA + WILSON WK
CRACK PROPAGATION TESTING FOR LMFBR PIPING - PHASE II FINAL REPORT
WESTINGHOUSE ELECTRIC CORP., MADISON, PA.
WARD-HT-3065-25 +, 69 PPS, REFS, APRIL 1977

RESULTS ARE REPORTED FOR PHASE II OF A COMBINED EXPERIMENTAL AND ANALYTIC PROGRAM TO EVALUATE LEAK-BEFORE-BREAK CONDITIONS IN LMFBR PIPING SYSTEMS. EMPHASIS IS PLACED ON PIPING ELBOWS, PARTICULARLY THE FFTF LOWER INLET DOWNCOMER ELBOW. THE BURST MODE OF RELATIVELY THIN WALL 304 STAINLESS STEEL PIPING ELBOWS CONTAINING THROUGH WALL FLAWS IS ONE OF PLASTIC INSTABILITY. BURST TEST RESULTS OF FLAWED SCALE MODEL ELBOWS AS WELL AS A FULL SCALE 14 INCH DIAMETER FFTF ELBOW AGREE WELL WITH SEVERAL THEORIES OF BURSTING OF STRAIGHT CYLINDRICAL PIPES WITH THROUGH WALL FLAWS. THESE TESTS DEMONSTRATE THAT CRITICAL CRACK SIZES CAN BE RELIABLY COMPUTED FOR LMFBR

127586 *CONTINUED*
PIPING SYSTEMS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

WESTINGHOUSE + R AND D PROGRAM + *PIPES AND PIPE FITTINGS + *CRACK + *REACTOR, LMFBR + TESTING + FLAW + LEAK + JACOBS

127686
KAPLAN S + PUNCHES JR
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEFR-00076 +, 120 PPS, 67 FIGS, REFS, FEB. 1977

SINCE THE INITIAL OBSERVATION OF IRRADIATION-INDUCED MATERIAL SWELLING, GE HAS BEEN CONCERNED ABOUT THE ABILITY OF THE WIRE-WRAP FUEL ASSEMBLY TO SUCCESSFULLY ACCOMMODATE THESE SWELLING EFFECTS AT TARGET FLUENCE LEVELS. IN 1973 GE INVESTIGATED THE QUESTION OF WIRE-WRAP ASSEMBLY OPERATION AND INITIATED THE DEVELOPMENT OF ADVANCED WIRE-WRAP DESIGNS CAPABLE OF MEETING TARGET LMFBR OPERATING CONDITIONS. THROUGH FY-76 A SERIES OF DETAILED ANALYTICAL AND THEORETICAL INVESTIGATIONS WERE COMPLETED AS WELL AS A SERIES OF DETAILED MECHANICAL TESTS DIRECTED TOWARD ASCERTAINING THE COMPRESSION AND DISPLACEMENT CHARACTERISTICS OF VARIOUS WIRE-WRAP DESIGNS. THIS REPORT DOCUMENTS THE HIGHLIGHTS OF THE MECHANICAL TESTS OF VARIOUS HIGH PRIORITY WIRE-WRAP ASSEMBLY DESIGNS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

GENERAL ELECTRIC + R AND D PROGRAM + RADIATION DAMAGE + *MATERIAL + *SWELLING + *FUEL ELEMENTS + REACTOR, LMFBR + PROPERTY, MECHANICAL + JACOBS

127820
CHANG YW
APPLICATION OF CONTAINMENT CODES TO LMFBRS IN THE UNITED STATES
ARGONNE NATIONAL LAB., ILL.
15 PPS, 2 TABS, 16 FIGS, 32 REFS, NUCLEAR ENGINEERING & DESIGN, 42(1), PP. 53-67 (JUNE 1977)

THIS PAPER DESCRIBES THE APPLICATION OF CONTAINMENT CODES TO PREDICT THE RESPONSE OF THE FAST REACTOR CONTAINMENT AND THE PRIMARY PIPING LOOPS TO HCDAS. FIVE SAMPLE PROBLEMS ARE GIVEN TO ILLUSTRATE THEIR APPLICATIONS. THE FIRST PROBLEM DEALS WITH THE RESPONSE OF THE PRIMARY CONTAINMENT TO AN HCDA. THE SECOND PROBLEM DEALS WITH THE COOLANT FLOW IN THE REACTOR LOWER PLENUM. THE THIRD PROBLEM CONCERNS SODIUM SPILLAGE AND SLUG IMPACT. THE FOURTH PROBLEM DEALS WITH THE RESPONSE OF A PIPING LOOP. THE FIFTH PROBLEM ANALYZES THE RESPONSE OF A REACTOR HEAD CLOSURE. APPLICATION OF CODES IN PARAMETRIC STUDIES AND COMPARISON OF CODE PREDICTIONS WITH EXPERIMENTS ARE ALSO DISCUSSED.

JACOBS + ACCIDENT, HYPOTHETICAL + ACCIDENT, CORE DISRUPTIVE + REACTOR, LMFBR + CONTAINMENT + CONTAINMENT VESSEL LOADING + CONTAINMENT ANALYSIS

127832
AGGARWAL SK + HUSAIN M + MAXWELL JA
ENVIRONMENTAL TESTING OF CLASS 1E AC MOTOR CONTROL CENTER FOR NUCLEAR POWER PLANTS
BECHTEL POWER CORP., GAITHERSBURG, MARYLAND + GA. POWER CO., ATLANTA
5 PPS, 2 TABS, 6 FIGS, IEEE TRANS, POWER APPARATUS & SYSTEMS, PAS-96(1), PP. 9-13 (JAN. 1977)

REPORTS THE TESTING OF A CLASS 1E AC MOTOR CONTROL CENTER, WHICH WAS SUBJECTED TO HIGH TEMPERATURE/HUMIDITY ENVIRONMENT AND PRESSURE PULSES. THE TEST PROGRAMS, SIMULATING THE EFFECTS OF A HIGH-ENERGY STEAM LINE BREAK IN A BWR MARK 1 CONTAINMENT NUCLEAR POWER PLANT, ARE DESCRIBED. THE MOTOR CONTROL CENTER FUNCTIONED SATISFACTORILY DURING AND AFTER THE TEST.

*TESTING + ENVIRONMENT + *MOTORS + *CONTROL SYSTEM + INSTRUMENT, CONTROL + QUALIFICATION + REACTOR, BWR + MATCH 1 (BWR)

128000
COATED FUEL PARTICLES - FABRICATION
36 PPS, TABS, FIGS, REFS, NUCLEAR TECHNOLOGY, 38(2), PP. 217-253 (SEPT. 1977)

THIS SECTION HAS FOUR PAPERS AS FOLLOWS: PROCESSING AND COMPOSITION CONTROL OF WEAK-ACID-RESIN-DERIVED FUEL MICROSPHERES / G.W. WEBER, R.L. BEATTY, V.J. TENNERY; IMPROVED GAS DISTRIBUTOR FOR COATING HIGH-TEMPERATURE GAS-COOLED REACTOR FUEL PARTICLES / W.J. LACKEY, D.P. STINTON, J.D. SEASE; COATED FUEL PARTICLES: REQUIREMENTS AND STATUS OF FABRICATION TECHNOLOGY / H. HUSCHKA, P. VYGEN; AND NUCLEAR FUEL COATED PARTICLE DEVELOPMENT IN THE REACTOR FUEL ELEMENT LABORATORIES OF THE U.K. ATOMIC ENERGY AUTHORITY / P.O. ALLEN, L.H. FORD, J.V. SHENNAN.

COATED PARTICLE + FABRICATION + COMPOSITION + REACTOR, HTGR + UNITED KINGDOM

128326

128326 *CONTINUED*
DEYNHAUSEN H + MORGENSTERN F1 + SCHOLLE U
DESIGN REQUIREMENTS FOR THE SNR-300 CONTAINMENT SYSTEM
INTERATOM, BENSBERG, W. GERMANY
CONF-761001(VOL. II) +. 8 PPS. PP. 452-60. FROM PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS: CHICAGO, ILL., OCT. 5-8, 1976

THE ESSENTIAL DESIGN DATA OF THE SNR-300 CONTAINMENT SYSTEM WERE DERIVED FROM THE RESULTS OF ANALYSES OF A HYPOTHETICAL CORE DISRUPTION ACCIDENT (HCDA). THE THERMODYNAMIC LOADS TO BE EXPECTED AFTER AN HCDA ARE CARRIED BY THE INNER CONTAINMENT. THE CONFINEMENT OF THE ACTIVITY RELEASED FOLLOWING AN HCDA IS ACHIEVED BY USE OF A REVENTING SYSTEM IN THE OUTER CONTAINMENT. THE ESSENTIAL RESULTS OF THE THERMODYNAMIC ANALYSIS ARE GIVEN AS WELL AS THE DESIGN DATA OF THE SYSTEM. THE RESULTS OF THE AEROSOL-PHYSICAL ANALYSIS ARE DISCUSSED WITH REGARD TO THEIR IMPORTANCE FOR THE SAFETY OF THE AUXILIARY EQUIPMENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

GERMANY + *REACTOR, LMFBR + *ACCIDENT, CORE DISRUPTIVE + *CONTAINMENT, PRESSURE VENTING + THERMODYNAMICS + CONTAINMENT VESSEL LOADING + AEROSOL, RADIOACTIVE + CONTAINMENT + SYSTEM DESCRIPTION + CONTAINMENT DESIGN

128659
KAWAGUCHI O + ANDO Y + YOSHIZAWA H + SASANUMA K
EXPERIMENTAL STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL TO AN HCDA
POWER REACTOR & NUCLEAR FUEL DEVELOPMENT CORP., TOKYO + UNIV. OF TOKYO, JAPAN
9 PPS. 7 FIGS. 4 REFS. NUCLEAR ENGINEERING & DESIGN, 42(1), PP. 105-13 (JUNE 1977) (FROM SEMINAR HELD IN CONJUNCTION WITH 4TH SMIRTH CONF.)

THIS PAPER PRESENTS A DISCUSSION OF EXPERIMENTAL RESULTS FOR REACTOR STRUCTURE DYNAMIC RESPONSE DURING AN FBR HYPOTHETICAL CORE DISRUPTIVE ACCIDENT (HCDA) AND THE RESULTS OF ANALYSIS USING A DYNAMIC RESPONSE ANALYSIS CODE UNDER EXPERIMENTAL CONDITIONS. THE PURPOSE OF THIS STUDY IS TO CLARIFY EXPERIMENTALLY THE DYNAMIC RESPONSE BY USE OF SCALE MODELS, AS WELL AS TO ATTEMPT TO CONFIRM AND IMPROVE THE DYNAMIC RESPONSE ANALYSIS CODE ON THE BASIS OF EXPERIMENTAL DATA. OBTAINED VALUES WERE COMPARED WITH EXPERIMENTAL VALUES, SHOWING THAT THIS METHOD WAS FAIRLY CAPABLE OF EVALUATING RADIAL DEFORMATION BEHAVIOR IN LOWER CYLINDRICAL PARTS OF THE VESSEL.

REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + STRUCTURAL ANALYSIS, DYNAMIC + FAILURE, PRESSURE VESSEL + JAPAN + COMPARISON, THEORY AND EXPERIENCE

129485
SWINDEMAN RW + BHARGAVA RK + SIKKA VK + MOTEFF J
SUBSTRUCTURES DEVELOPED DURING CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (HEAT 9T2796)
OAK RIDGE NATIONAL LAB., TENN.
ORNL-5293 +. 36 PPS. REFS. SEPT. 1977

DATA INCLUDE DISLOCATION DENSITIES, CELL AND SUBGRAIN SIZES, AND CARBIDE PRECIPITATION SIZES. TESTING CONDITIONS RANGE FOR TEMPERATURES FROM 482 TO 649 DEG C, FOR STRESSES FROM 28 TO 241 MPA, AND FOR TIMES FROM 4 TO 15,000 HR. AS EXPECTED, IT IS OBSERVED THAT TEMPERATURE, STRESS, AND TIME HAVE STRONG INFLUENCES ON SUBSTRUCTURES. AT STRESSES RANGING FROM 69 TO 172 MPA AND AT TEMPERATURES RANGING FROM 482 TO 593 DEG C, THE DISLOCATION DENSITY INCREASES WITH INCREASING STRESS AND IT IS GENERALLY HIGHER THAN EXPECTED FROM STUDIES MADE AT HIGHER TEMPERATURES. DISLOCATIONS ARE ARRANGED IN FINE NETWORKS STABILIZED BY CARBIDES. AT STRESSES ABOVE 172 MPA AND TEMPERATURES TO 649 DEG C, THE DISLOCATION DENSITY IS TOO GREAT TO MEASURE.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + REACTOR, LMFBR + CREEP + STEEL, STAINLESS

129931
DICKERMAN CE
SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW
ARGONNE NATIONAL LAB., ILL.
ANL-77-40 +. 37 PPS. 5 TABS. 2 FIGS. 36 REFS. JUNE 1977

EXPERIMENTAL DATA ON FUEL FAILURE AND ITS CONSEQUENCES ARE USED TO PROVIDE PREDICTIONS OF THE EXTENDED FUEL MOTION THAT WOULD OCCUR AFTER A HYPOTHETICAL CORE-DISRUPTIVE LOSS-OF-FLOW ACCIDENT WITHOUT SCRAM IN THE FAST TEST REACTOR. THESE DATA INDICATE THAT SEVERELY DAMAGED SUBASSEMBLIES WILL NOT BE COOLABLE IN SITU BY RETURNING SODIUM AFTER THE ACCIDENT, BECAUSE OF STEEL AND FUEL BLOCKAGES, AND SUGGEST THAT THE SEVERELY DAMAGED, MELTED FUEL WILL EVENTUALLY DISPERSE UPWARD UNDER THE INFLUENCE OF VAPOR GENERATED BY DECAY HEATING.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + FTR (TR) + ACCIDENT, LOSS OF FLOW + CORE MELTDOWN + ACCIDENT, CORE DISRUPTIVE + DECAY HEAT + FLOW BLOCKAGE + ANL + JACOBS

130653
GARDNER PL + ERDMAN CA + REYNOLDS AB
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT
UNIV. OF VA., CHARLOTTESVILLE

130653 *CONTINUED*
NUREG-0344 +. 141 PPS. 8 TABS. 16 FIGS. 51 REFS. OCT. 1977

CONDENSATION OF A PURE, SATURATED VAPOR ONTO A VERTICAL, MELTING SUBSTRATE IS ANALYZED FOR BOTH ONE- AND TWO-MATERIAL SITUATIONS. THE RESULTS OF THIS ANALYSIS HAVE APPLICATIONS IN THE AREA OF LMFBR ACCIDENT ANALYSIS. CONDENSATION OF THE FUEL (A MIXTURE OF URANIUM DIOXIDE AND PLUTONIUM DIOXIDE) ONTO THE ABOVE-CORE STRUCTURE (STEEL) IS A MECHANISM FOR REDUCING THE ENERGY AVAILABLE TO MECHANICALLY DAMAGE THE PRIMARY SYSTEM BOUNDARY. CONDENSATION WILL ALSO ALTER THE RADIOACTIVE AEROSOL SOURCE TERM AVAILABLE FOR POTENTIAL RELEASE FROM THE PRIMARY SYSTEM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

REACTOR, LMFBR + ACCIDENT ANALYSIS + *ACCIDENT, CORE DISRUPTIVE + *CONDENSATION + *VAPOR EXCHANGE + *CONTAINMENT INTEGRITY + MAIN COOLING SYSTEM + FUEL ROD + AEROSOL, RADIOACTIVE + FISSION PRODUCT TRANSPORT + JACOBS + HJCK + NRC-7

130821
MATERIALS SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING
125 PPS. ANS TRANSACTIONS, VOL. 27, PP. 220-345 (DEC. 1977)

THESE PAPERS WERE PRESENTED AT THE 1977 ANS WINTER MEETING AT SAN FRANCISCO IN NOV-DEC CONCERNING MATERIALS SCIENCE AND TECHNOLOGY. TOPICS INCLUDE MATERIALS FOR LMFBR COMPONENTS; FUEL CLADDING TECHNOLOGY; CREEP ANALYSIS; SWELLING; IRRADIATION TESTING OF METALS; THORIUM BEHAVIOR AND COMPUTER MODELS; MATERIALS TECHNOLOGY OF THORIUM FUELS; COMPUTER MODELING FOR NUCLEAR MATERIALS APPLICATIONS; AND FISSION FUELS FOR FISSION-FUSION HYBRID REACTORS.

AVAILABILITY - AMERICAN NUCLEAR SOCIETY, 244 E. OGDEN AVE., HINSDALE, ILL. 60521

*MATERIAL + *TECHNOLOGY + REACTOR, LMFBR + COMPONENTS + FUEL ROD + CLADDING + IRRADIATION TESTING + METALLURGY + THORIUM + ANALYTICAL MODEL + FUEL, NUCLEAR + FUSION + *POWER PLANT, NUCLEAR

130974
SUN Y-H + OKRENT D + CATTON I + KASTENBERG WE
A SIMPLIFIED METHOD OF COMPUTING CLAD AND FUEL STRAIN AND STRESS DURING IRRADIATION
UNIV. OF CALIF., LOS ANGELES
NUREG-0260 +. 287 PPS. TABS. FIGS. REFS. JUNE 1977

THIS DISSERTATION DEVELOPS A SIMPLIFIED, FAST-RUNNING AXISYMMETRIC COMPUTER CODE, NAMED KRASS (KWIK RUNNING ANALYSIS FOR STRESS AND STRAIN), INTENDED FOR THE PREDICTION OF FUEL ELEMENT CONDITIONS AFTER LONG-TERM STEADY-STATE OPERATION IN A LMFBR. THE OUTPUT OF KRASS INCLUDES THE RADIAL AND AXIAL STRESS AND STRAIN DISTRIBUTION OF THE FUEL AND CLAD AS A FUNCTION OF THE BURN-UP. RESULTS OF THE CALCULATIONS INDICATE THAT THE AXIAL VARIATION OF THE FUEL-CLAD MECHANICAL INTERACTION GREATLY DEPENDS ON THE FLUENCE-TO-BURNUP RATIO, AS WELL AS ON THE APPLICABLE STAINLESS STEEL SWELLING CORRELATION. AT HIGH FLUENCE-TO-BURNUP RATIOS, THE CENTRAL AXIAL NODES FREQUENTLY EXHIBIT GAP REOPENING TENDENCIES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FUEL ELEMENTS + FUEL CLAD INTERACTION + STRESS STRAIN DATA + REACTOR, LMFBR + COMPUTER PROGRAM + CREEP + SWELLING + STEEL, STAINLESS + HJCK + NRC-7

12. PLANT SAFETY FEATURES - REACTOR

119193
MCPHEETERS CC + RAUE D
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING
ARGONNE NATIONAL LABORATORY, ILLINOIS
CONF-760503-3 +. 7 PPS. FROM INTERNATIONAL CONFERENCE ON LIQUIFIED METAL TECHNOLOGY IN ENERGY PRODUCTION; CHAMPION, PA. MAY 3, 1976

CONTROL OF TRITIUM IN THE SODIUM COOLANT OF LMFBRS IS IMPORTANT FOR ACHIEVING AS LOW AS PRACTICABLE RELEASE OF RADIOACTIVITY. COLD-TRAPPING HAS BEEN SHOWN TO BE AN EFFECTIVE METHOD FOR CONTROLLING HYDROGEN IN SODIUM AND SHOULD BE EFFECTIVE FOR CONTROLLING TRITIUM AS WELL. TWO MECHANISMS FOR REMOVAL OF TRITIUM FROM SODIUM HAVE BEEN STUDIED: (1) COPRECIPITATION OF HYDROGEN AND TRITIUM FROM SOLUTION IN SODIUM IN A COLD TRAP AND (2) ISOTOPIC EXCHANGE OF TRITIUM IN SODIUM WITH HYDROGEN IN SOLID NAH IN A COLD TRAP. THE ISOTOPIC EXCHANGE MECHANISM BY ITSELF CANNOT BE EXPECTED TO ADEQUATELY CONTROL TRITIUM IN LMFBRS. HYDROGEN SOURCES SUCH AS CORROSION IN THE STEAM GENERATORS WILL BE IMPORTANT FACTORS IN CONTROLLING THE TRITIUM LEVEL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FILTER, TRAP + DECONTAMINATION + REACTOR, LMFBR + TRITIUM + SODIUM + HYDROGEN

121014
HILLIARD RK + MCCORMACK JD + POSTMA AK
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 76-41 +. 267 PPS. 51 TABS. 50 FIGS. DEC. 1976

NINETEEN DIFFERENT AIR CLEANING CONCEPTS ARE ARRANGED INTO TWENTY-FOUR SYSTEMS AND EVALUATED FOR USE AS ACCIDENT MITIGATING SYSTEMS IN LMFBR PLANTS. BOTH SINGLE, LOW-LEAKAGE CONTAINMENT PLANTS AND ONCE-THROUGH OPERATION, APPLICABLE TO CONTAINMENT/CONFINEMENT PLANTS ARE CONSIDERED. PLANT CHARACTERISTICS AFFECTING AIR CLEANING REQUIREMENTS ARE DEFINED FOR 1000 MWE PLANTS AND A SODIUM AND RADIOLOGICAL RELEASE TERM IS POSTULATED. THE ACCIDENT CONDITIONS UNDER WHICH THE EMERGENCY AIR CLEANING SYSTEM (EACS) MUST FUNCTION IS ESTABLISHED BY USE OF SOFIRE-II AND HAA-3B COMPUTER CODES. CRITERIA ARE DEVELOPED FOR EVALUATING THE VARIOUS SYSTEMS AND FOR ASSIGNING COMPARATIVE RATINGS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

AIR CLEANING + FISSION PRODUCT RELEASE + AEROSOL + CONTAINMENT + DESIGN CRITERIA + FILTER, BED + REACTOR, LMFBR + SODIUM + CHARCOAL + SCRUBBER + FILTER, SAND + FILTERS + JACOBS

121729
GLUEKLER EL
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS
GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
GEAP-14121 +. 53 PPS. 8 TABS. 27 FIGS. 19 REFS. AUG. 1976

THE SELECTION OF AN EXVESSEL POST-ACCIDENT HEAT REMOVAL AND CORE RETENTION CONCEPT IS DESCRIBED. A CRUCIBLE SYSTEM WITH ACTIVE HEAT REMOVAL SYSTEM SEEMED THE MOST PROMISING. THE CRUCIBLE CONCEPT IS DESCRIBED IN DETAIL AND SCOPING ANALYSES ADDRESSING THE THERMAL AND STRUCTURAL PERFORMANCE OF THE SYSTEM ARE PRESENTED.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*CORE CATCHER + REACTOR, LMFBR + ACCIDENT, CORE DISRUPTIVE + CORE MELTDOWN + THERMAL ANALYSIS + PERFORMANCE + JACOBS + SODIUM + ACCIDENT, HYPOTHETICAL

124676
RICKARD CL + SIMON RH + BUTTENER DR
GAS-COOLED FAST REACTOR SAFETY
GENERAL ATOMIC CO., SAN DIEGO, CALIF.
IAEA-CN-36/36 +. 11 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE; SALZBURG, AUSTRIA, MAY 2-13, 1977

THE INHERENT AND DESIGN RELATED SAFETY FEATURES OF THE 300-MW(E) GAS-COOLED FAST BREEDER REACTOR (GCFR) DEMONSTRATION PLANT ARE DESCRIBED. THE INHERENT FEATURES ARE PRINCIPALLY ASSOCIATED WITH THE HELIUM COOLANT AND THE NUCLEAR COEFFICIENTS WHEREAS THE DESIGN RELATED FEATURES INFLUENCING SAFETY INCLUDE THE TWO REACTOR SHUTDOWN SYSTEMS, THE TWO RESIDUAL HEAT REMOVAL SYSTEMS, PRESTRESSED CONCRETE REACTOR VESSEL, AND THE METHOD OF CORE SUPPORT EMPLOYED. THE SAFETY CHARACTERISTICS ARE FOUND TO IMPROVE AS PLANT SIZE INCREASES.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*REACTOR, GCR + REACTOR, FAST + REACTOR, BREEDER + SAFETY ANALYSIS + SYSTEM DESCRIPTION + *REACTOR DESCRIPTION

126065
CHAN CK + MIN TK + OKRENT D + CATTON I + KASTENBERG WE
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS

126085 *CONTINUED*
UNIV. OF CALIF., LOS ANGELES
NUREG-0259 +, 85 PPS, 5 TABS, 14 FIGS, 10 REFS, MAY 1977

THIS REPORT EXPLORES IN PRELIMINARY FASHION THE COURSE OF A POSTULATED ACCIDENT SCENARIO IN AN LMFBR INVOLVING RUPTURE OF ALL PIPING CONNECTED TO A REACTOR VESSEL IN THE EVENT OF AN EARTHQUAKE (OR AN EQUIVALENT SCENARIO INVOLVING BOTH LOSS OF HEAT REMOVAL AND SYSTEM RUPTURE). THE CORE IS SUCCESSFULLY SHUT DOWN BUT DECAY HEAT IMPOSES A THREAT TO CORE INTEGRITY. A POSSIBLE ACCIDENT SCENARIO WITH THESE INITIAL CONDITIONS IS PRESENTED, INCLUDING SODIUM VOIDING, CLAD AND FUEL MELDOWN, AND POSSIBLE RECRITICALITY.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

ACCIDENT, CORE DISRUPTIVE + REACTOR, LMFBR + ACCIDENT, LOSS OF COOLANT + DECAY HEAT + FUEL MELTDOWN + CORE MELTDOWN + ACCIDENT ANALYSIS + JACOBS + HJCK + NRC-7

127818
MARCHATERRE JP
OVERVIEW OF CORE DISRUPTIVE ACCIDENTS
ARGONNE NATIONAL LAB., ILL.
7 PPS, 2 FIGS, 37 REFS, NUCLEAR ENGINEERING & DESIGN, 42(1), PP. 11-17 (JUNE 1977)

AN OVERVIEW OF THE ANALYSIS OF CORE-DISRUPTIVE ACCIDENTS IS GIVEN. THESE ANALYSES ARE FOR THE PURPOSE OF UNDERSTANDING AND PREDICTING FAST REACTOR BEHAVIOR IN SEVERE LOW PROBABILITY ACCIDENT CONDITIONS, TO ESTABLISH THE CONSEQUENCES OF SUCH CONDITIONS AND TO PROVIDE A BASIS FOR EVALUATING CONSEQUENCE LIMITING DESIGN FEATURES. THE METHODS USED TO ANALYZE CORE-DISRUPTIVE ACCIDENTS FROM INITIATING EVENT TO COMPLETE CORE DISRUPTION, THE EFFECTS OF THE ACCIDENT ON REACTOR STRUCTURES AND THE RESULTING RADIOLOGICAL CONSEQUENCES ARE DESCRIBED.

*ACCIDENT, CORE DISRUPTIVE + *REVIEW + REACTOR, LMFBR + ACCIDENT, CONSEQUENCES + CONTAINMENT INTEGRITY + ENGINEERED SAFETY FEATURE + DESIGN CRITERIA + RADIOLOGICAL IMPACT + ACCIDENT ANALYSIS

130854
NUCLEAR REACTOR SAFETY - ANS 1977 WINTER MEETING
176 PPS, ANS TRANSACTIONS, VOL. 27, PP. 496-672 (DEC. 1977)

THESE PAPERS WERE PRESENTED AT THE 1977 ANS WINTER MEETING AT SAN FRANCISCO IN NOV-DEC CONCERNING NUCLEAR REACTOR SAFETY : SAFETY EXPERIMENTS (IN AND OUT OF PILE) AND ANALYSIS, STRUCTURAL RESPONSE/SODIUM FIRES AND SPILLS, ACCIDENT ANALYSIS, OFF-NORMAL HEAT TRANSFER/DETECTION METHODS, AND FUEL BEHAVIOR MODELING/SAFETY RELATED DESIGN; THERMAL REACTOR SAFETY: CONTAINMENT ANALYSIS AND EXPERIMENTS, FUEL BEHAVIOR AND PRESSURE VESSEL THERMAL SHOCK, AND LOCA/ECCS EXPERIMENTS AND ANALYSIS; BEHAVIOR OF AIRBORNE RADIOACTIVITY RELEASE IN CONTAINMENT; PROBABILISTIC DESIGN AND SAFETY ANALYSIS; POST-ACCIDENT HEAT REMOVAL; AND MOLTEN FUEL-COOLANT INTERACTION.

AVAILABILITY - AMERICAN NUCLEAR SOCIETY, 244 E. OGDEN AVE., HINSDALE, ILL. 60521

REACTOR, FAST + REACTOR, LMFBR + REACTOR, PWR + REACTOR, BWR + *SAFETY ANALYSIS + *ACCIDENT ANALYSIS + CONTAINMENT ANALYSIS + PRESSURE VESSELS + THERMAL ANALYSIS + ACCIDENT, LOSS OF COOLANT + ACCIDENT, CORE DISRUPTIVE + FUEL COOLANT INTERACTION + ACCIDENT, PROBABILITY OF + EMERGENCY COOLING SYSTEM + SODIUM + FIRE

13. PLANT SAFETY FEATURES - NONREACTOR

119248
PASCHALL RK
DECONTAMINATION AND DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF NEW PLUTONIUM FACILITIES
ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.
AI-ERDA-13156 +. 127 PPS. 12 REFS. JUNE 30, 1975

DECONTAMINATION AND DECOMMISSIONING (D&D) CRITERIA WERE ASSEMBLED FOR USE IN DESIGNING NEW PLUTONIUM FACILITIES. THESE CRITERIA WERE GATHERED FROM LITERATURE SEARCHES AND VISITS TO MANY PLUTONIUM FACILITIES AROUND THE COUNTRY. THE RECOMMENDATIONS OF REPORTS AND EXPERIENCED PERSONNEL WERE USED. SINCE TOTAL D&D COSTS CAN BE MILLIONS OF DOLLARS, IMPROVED DESIGNS TO FACILITATE D&D WILL RESULT IN CONSIDERABLE SAVINGS IN COST AND TIME AND WILL HELP TO LEAVE THE SITE FOR UNRESTRICTED FUTURE USE AFTER D&D. FINALLY, BETTER DESIGN WILL REDUCE HAZARDS AND IMPROVE SAFETY DURING THE D&D EFFORT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

DECONTAMINATION + DECOMMISSIONING + DESIGN CRITERIA + FUEL REPROCESSING + REACTOR, LMFBR + PLUTONIUM + WASTE DISPOSAL

120966
GUILLAUME B
PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)
15 PPS. 7 FIGS. 24 REFS. BULLETIN D'INFORMATIONS SCIENTIFIQUES ET TECHNIQUES. NO. 217. PP. 31-46 (SEPT. 1976)

ACTINIDE ELEMENTS WILL BE ESSENTIALLY RESPONSIBLE FOR THE LONG TERM RADIOACTIVE HAZARD OF NUCLEAR WASTES. A CHARACTERISTIC HAZARD INDEX HAS BEEN CALCULATED SO THAT ACTINIDE REMOVAL REQUIREMENTS COULD BE EVALUATED TO REACH A BEARABLE RADIOTOXICITY LEVEL FOR WASTES. THESE CALCULATIONS HAVE TAKEN ACCOUNT OF THE REACTOR TYPE AND ACTINIDE ELEMENTS WITH THEIR DECAY PRODUCTS. THE MOST SUITABLE REMOVAL TECHNIQUE APPEARS TO BE SOLVENT EXTRACTION. THREE EXAMPLES OF PROMISING PROCESSES, BASED UPON THIS TECHNIQUE ARE BRIEFLY EXPOSED.

FUEL REPROCESSING + FUEL CYCLE + WASTE TREATMENT + REACTOR, LMFBR + TRANSURANIUM ELEMENT + ACTINIDE

121108
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO
1 PG. NUCLEAR NEWS. 20(1). PG. 37 (JAN. 1977)

THE GENERAL ACCOUNTING OFFICE HAS PROJECTED THAT THE FUEL CYCLE TECHNOLOGIES--REPROCESSING, FUEL FABRICATION, AND WASTE DISPOSAL--ASSOCIATED WITH THE LIQUID-METAL FAST BREEDER REACTOR ARE MORE LIKELY TO SLOW UP THE COMMERCIALIZATION OF THE LMFBR THAN THE DEVELOPMENT OF THE REACTOR ITSELF. THE GAO JUDGES THE LMFBR FUEL CYCLE TECHNOLOGIES TO BE LAGGING, AND THIS CONDITION MAY ALLOW ONLY FOUR TO SIX COMMERCIAL LMFBR'S TO BE IN OPERATION BY THE YEAR 2000. THE GAO RECOMMENDED THAT ERDA ASSEMBLE A MORE COORDINATED DEVELOPMENT PROGRAM FOR THE LMFBR AND ITS THREE SUPPORT TECHNOLOGIES.

FUEL CYCLE + REACTOR, LMFBR + AGENCY, ERDA + LEGALISTICS + FUEL REPROCESSING + WASTE MANAGEMENT

121348
TENNERY VJ + BOMAR ES + BOND WD + MORSE LE
ENVIRONMENTAL ASSESSMENT OF LMFBR ADVANCED FUELS: A RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, REFABRICATION AND TRANSPORTATION
OAK RIDGE NATIONAL LABORATORY, TENNESSEE
ORNL-5238 +. 47 PPS. 26 TABS. 17 FIGS. 25 REFS. NOV. 1976

A RADIOLOGICAL ENVIRONMENTAL ASSESSMENT WAS PERFORMED FOR ADVANCED LMFBR FUELS AND THE RESULTS COMPARED WITH THOSE FOR REFERENCE MIXED OXIDE FUEL. TOTAL-BODY DOSE COMMITMENTS TO THE MAXIMALLY EXPOSED INDIVIDUAL FOR OXIDE AND CARBIDE FUEL ARE ABOUT 2.8 MILLIREMS, WHILE NITRIDE FUEL WOULD RESULT IN A RANGE OF 59 TO 3.4 MILLIREMS AS THE 14N CONTENT IN FRESH FUEL IS VARIED FROM 99.64% TO ZERO. DOSES TO TRANSPORT WORKS AND THE GENERAL POPULATION WHICH RESULT FROM TRANSPORTATION OF THE VARIOUS FUEL FORMS AND WASTE MATERIALS WERE ALSO CALCULATED. DOSES TO THE GENERAL POPULATION ALONG THE TRANSPORATION ROUTES WERE CALCULATED AS 354, 315, AND 325 MAN-REMS/YEAR FOR OXIDE, CARBIDE, AND NITRIDE FUELS RESPECTIVELY.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*TRANSPORTATION AND HANDLING + DOSE CALCULATION, EXTERNAL + *POPULATION EXPOSURE + WASTE TRANSPORTATION + JACOBS + MIXED OXIDE + FUEL REPROCESSING + REACTOR, LMFBR + FABRICATION FACILITY + RADIOACTIVITY RELEASE + FUEL RECYCLE

122839
HORNER DE + CROUSE DJ
LABORATORY DEVELOPMENT OF SOLVENT EXTRACTION PROCESS FOR SPENT LMFBR FUELS
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5729 +. 92 PPS. 26 TABS. 17 FIGS. 27 REFS. JAN. 1977

RESULTS ARE SUMMARIZED FOR LABORATORY-SCALE DEVELOPMENT STUDIES OF SOLVENT EXTRACTION PROCESSES FOR TREATING SHORT-COOLED LMFBR FUELS. AMINE EXTRACTANTS WERE EVALUATED, BUT THE PUREX (TBP

122839 *CONTINUED*
EXTRACTION) PROCESS RECEIVED PRINCIPAL EMPHASIS AND IS THE RECOMMENDED PROCESS. EXTENSIVE PLUTONIUM AND URANIUM EXTRACTION AND STRIPPING DATA WERE OBTAINED OVER A RANGE OF NITRIC ACID CONCENTRATIONS, TBP CONCENTRATIONS, AND TEMPERATURES. THESE DATA WERE USED TO ESTIMATE SUITABLE FLOWSHEET CONDITIONS FOR EACH PROCESS CYCLE, AND BATCH COUNTERCURRENT DEMONSTRATIONS WERE THEN MADE WITH SIMULATED FEEDS. FINALLY, 5-CYCLE BATCH DEMONSTRATIONS OF THE FIRST EXTRACTION-STRIPPING CYCLE WERE MADE WITH ACTUAL FUEL SOLUTIONS. A COMPUTER CODE (SEPHIS) WAS DEVELOPED FOR PREDICTING THE STAGEWISE DISTRIBUTION OF PLUTONIUM, URANIUM, AND NITRIC ACID IN THE EXTRACTION AND STRIPPING SYSTEMS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

FUEL REPROCESSING + FUEL RECYCLE + COMPUTER PROGRAM + REACTOR, LMFBR + PLUTONIUM + PHOSPHATE + SOLVENT EXTRACTION PROCESS + JACOBS

124449
ALLARDICE RH + BUCK C + WILLIAMS J
FAST REACTOR FUEL REPROCESSING IN THE UK
UKAEA + BRITISH NUCLEAR FUELS LTD.
IAEA-CN-36/66 +, 15 PPS, FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE; SALZBURG, AUSTRIA, MAY 2-13, 1977

DEVELOPMENT WORK ON THE LMFBR HAS BEEN CARRIED OUT IN THE UK SINCE THE EARLY 1950S. THE DOUNREAY EXPERIMENTAL REACTOR ESTABLISHMENT (DERE) INCLUDED PLANTS SPECIFICALLY DESIGNED FOR THE REPROCESSING, CONVERSION AND REFABRICATION OF HIGHLY ENRICHED URANIUM FUEL TO PROVIDE A TOTAL FUEL CYCLE CAPABILITY TO SUPPORT THE OPERATIONS OF DFR. DERE COULD BE CLAIMED TO HAVE BEEN THE FIRST NUCLEAR COMPLEX IN WHICH ALL FUEL CYCLE SERVICES WERE SITUATED ON THE SAME SITE AS A SINGLE REACTOR.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*FUEL REPROCESSING + *UNITED KINGDOM + REACTOR, FAST + REACTOR, LMFBR + *FUEL CYCLE + WASTE MANAGEMENT + R AND D PROGRAM

124989
IRVINE AR + JONES FJ
LMFBR SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-SCALE FACILITY
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5723 +, 287 PPS, FIGS, REFS, MARCH 1977

A SCOPING STUDY OF A LARGE-SCALE REPROCESSING FACILITY WAS PERFORMED AS A MEANS OF IDENTIFYING UNRESOLVED PROBLEMS IN THE REPROCESSING OF SPENT LMFBR FUELS AND DEVELOPING GENERAL CRITERIA FOR THE CONCEPTUAL DESIGN OF A PILOT PLANT TO TEST AND DEMONSTRATE SUCH REPROCESSING. THE RESULTS OF THIS STUDY, REPORTED HERE, COVER REMOTE MAINTENANCE, FEASIBILITY OF FLUIDS RECYCLE, FLOW DIAGRAM CONSIDERATIONS, VARIOUS ASPECTS OF FACILITY DESIGN AND ARRANGEMENT, AND THE EFFECTS OF VARIATION IN PREPROCESSING DECAY TIME BETWEEN 60 AND 365 DAYS. THE STUDY DEVELOPED THE RATIONALE FOR SIGNIFICANT PORTIONS OF THE PILOT-PLANT CRITERIA, WHICH ARE PRESENTED AS PART OF THE REPORT.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

FUEL REPROCESSING + DESIGN CRITERIA + TESTING + FUEL HANDLING + HOT CELL + REACTOR, LMFBR + COVER GAS + JACOBS + FUEL RECYCLE

125292
ENGLISH JL
CONSIDERATIONS FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A LITERATURE SURVEY
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5762 +, 60 PPS, 115 REFS, APRIL 1977

THE APPEAL OF WATER STORAGE OF SPENT FUEL ELEMENTS FOR THE PROPOSED LMFBR FUEL REPROCESSING HOT PILOT PLANT (HPP) IS CONSIDERABLE. WATER IS TRANSPARENT, ECONOMICAL, AND EASILY HANDLED IN A REPROCESSING PLANT THAT EMPLOYS BASICALLY AQUEOUS SEPARATION PROCESSES. THE EFFECT OF WATER ON THE INTEGRITY OF FUEL ELEMENT CLADDING CAN BE SEVERE, PROBABLY OWING TO CAUSTIC EMBRITTLEMENT AND LOCAL STRESSES GENERATED BY THE OXIDATION OF SODIUM IN MICROFISSURES EXISTING IN THE CLADDING. THAT MICROFISSURES DO EXIST SEEMS UNDENIABLE, AND THE MANY MECHANISMS POSTULATED FOR THE DETERMINATION OF THE PHYSICAL PROPERTIES OF AUSTENITIC STAINLESS STEEL IRRADIATED IN 1200 DEG F SODIUM ALL LEAD TO ENHANCED SUSCEPTIBILITY TO INTERGRANULAR FAILURE.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

FUEL REPROCESSING + FUEL STORAGE + STRESS + RADIATION DAMAGE + FFTF (TR) + REACTOR, HTGR + REACTOR, LMFBR + SODIUM + CORROSION + CLADDING + FUEL RECYCLE + MASS TRANSFER

126357
KASTEN PR + HOMAN FJ + ALLEN EJ + NOTZ KJ

126357 *CONTINUED*
ASSESSMENT OF THE THORIUM FUEL CYCLE IN POWER REACTORS
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5565 +. 252 PPS. TABS. FIGS. JAN. 1977

THREE THERMAL REACTORS WERE CONSIDERED: THE LWR, HTGR, AND HWR OF THE CANDU TYPE. A SUMMARY COMPARING THORIUM AND URANIUM FUEL CYCLES IN FAST BREEDER REACTORS (FBRS) WAS ALSO COMPILED. RELATIVE TO THERMAL REACTORS, RESULTS SHOW THAT BETTER U(SUB 3)O(SUB 8) UTILIZATION IS POSSIBLE USING THORIUM FUEL CYCLES THAN CAN BE ACHIEVED WITH URANIUM CYCLES. HOWEVER, THORIUM CYCLE USE DOES NOT CHANGE THE NEED FOR FBRS. THORIUM FUEL CYCLES COULD PRODUCE LOWER COST POWER THAN URANIUM CYCLES, PARTICULARLY AT HIGHER U(SUB 3)O(SUB 8) PRICES. GENERALLY, IT APPEARS MORE DESIRABLE ECONOMICALLY TO RECYCLE PLUTONIUM WITH THORIUM RATHER THAN WITH URANIUM IN THERMAL REACTORS. THE THORIUM CYCLE DOES NOT APPEAR TO COMPETE ECONOMICALLY IN PRESENT LWRS EVEN AT URANIUM PRICES OVER $100/LB. THORIUM FUELED HTGRS AND HWRS HAVE THE BEST FUEL UTILIZATION PERFORMANCE. USE OF METAL FUEL PROVIDES THE BEST NUCLEAR PERFORMANCE FROM THORIUM CYCLES, AND MIGHT LEAD TO AN ECONOMIC FBR WITH HIGH FUEL-UTILIZATION CHARACTERISTICS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

POWER PLANT, NUCLEAR + THORIUM + URANIUM + PLUTONIUM + FUEL CYCLE + COST BENEFIT + REACTOR, LWR + REACTOR, HTGR + REACTOR, HWR + REACTOR, BREEDER

127498
NICHOLSON EL
THE PUO2 DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR RESOLUTION
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5993 +. 137 PPS. JULY 1977

A SURVEY WAS MADE OF THE INFORMATION REPORTED TO DATE FOR LABORATORY-SCALE DISSOLUTION EXPERIMENTS ON PUO2-UO2 FUELS, OF REPROCESSING PLANT PROBLEMS THAT MIGHT BE ENCOUNTERED WITH THESE FUELS, AND OF THE FABRICATION METHODS FOR PRODUCING THESE FUELS. THE POSSIBILITY OF PRODUCING FUELS THAT WILL BE HIGHLY SOLUBLE IN PURE NITRIC ACID WITHOUT RESORTING TO THE USE OF CORROSIVE FLUORIDES FOR COMPLETE DISSOLUTION IS EXAMINED. THE REPORT CONCLUDES THAT PRODUCTION OF HIGHLY SOLUBLE FUEL IS POSSIBLE, THAT IT IS PROBABLY ECONOMICALLY JUSTIFIABLE, AND THAT FLUORIDES ARE NOT NECESSARY FOR DISSOLUTION.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

JACOBS + *DISSOLUTION + PLUTONIUM DIOXIDE + URANIUM DIOXIDE + FLUORIDE + MIXED OXIDE + *FUEL REPROCESSING + REACTOR, LWR + REACTOR, LMFBR

16. METEOROLOGICAL CONSIDERATIONS

118387
SNYDER WH + LAWSON RE
DETERMINATION OF A NECESSARY HEIGHT FOR A STACK CLOSE TO A BUILDING--A WIND TUNNEL STUDY
U.S. ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
9 PPS, ATMOSPHERIC ENVIRONMENT, VOL. 10, PP. 683-91 (1976)

WIND TUNNEL TESTS WERE CONDUCTED TO SHOW THAT THE 2.5 TIMES RULE FOR THE DETERMINATION OF A NECESSARY HEIGHT FOR A STACK CLOSE TO A BUILDING IS ADEQUATE FOR A BUILDING WHOSE WIDTH PERPENDICULAR TO THE WIND DIRECTION IS TWICE ITS HEIGHT, BUT THAT IT IS UNNECESSARILY CONSERVATIVE FOR A TALL THIN BUILDING. AN ALTERNATIVE RULE, CALLED BRIGGS' ALTERNATIVE, IS SHOWN TO BE ADEQUATE. THE STUDY WAS UNDERTAKEN IN A METEOROLOGICAL WIND TUNNEL BY PLACING MODEL STACKS AND BUILDINGS IN A SIMULATED NEUTRAL ATMOSPHERIC BOUNDARY LAYER.

*STACK + *DOWNWASH + BUILDING + METEOROLOGY + *LAPSE RATE, ADIABATIC, NEUTRAL + WIND TUNNEL EXPERIMENT

124149
RUSSO AJ + WAYLAND JR + RITCHIE LT
INFLUENCE OF PLUME RISE ON THE CONSEQUENCES OF RADIOACTIVE MATERIAL RELEASES
SANDIA LABS., ALBUQUERQUE, N.M.
SAND-76-0534 +, 26 PPS, 19 FIGS, JAN. 1977

ESTIMATES OF HEALTH CONSEQUENCES RESULTING FROM A POSTULATED NUCLEAR REACTOR ACCIDENT CAN BE STRONGLY DEPENDENT ON THE BUOYANT RISE OF THE PLUME OF RELEASED RADIOACTIVE MATERIAL. THE SENSITIVITY OF THE CONSEQUENCES OF A POSTULATED ACCIDENT TO TWO DIFFERENT PLUME RISE MODELS HAS BEEN INVESTIGATED. ONE OF THE MODELS INCLUDES THE EFFECTS OF EMISSION ANGLE, MOMENTUM, AND RADIOACTIVE HEATING OF THE RELEASED MATERIAL. THE DIFFERENCE IN THE CONSEQUENCE ESTIMATES FROM THE TWO MODELS CAN EXCEED AN ORDER OF MAGNITUDE UNDER SOME CONDITIONS, BUT IN GENERAL THE RESULTS ARE SIMILAR.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

PLUME BEHAVIOR + HEIGHT OF RISE + METEOROLOGY + DECAY HEAT

130540
GRIFFITHS RF
EFFECT OF DURATION OF RELEASE ON THE DISPERSION OF EFFLUENT RELEASED TO THE ATMOSPHERE
UKAEA SAFETY & RELIABILITY DIRECTORATE, WARRINGTON, UK
SRD-R-85 +, 35 PPS, JULY 1977

A BRIEF REVIEW OF THE AVAILABLE LITERATURE IS FOLLOWED BY A DESCRIPTION OF A COMPUTATIONALLY CONVENIENT METHOD OF INCORPORATING THE EFFECT OF DISPERSION CALCULATIONS BASED ON THE MODIFICATION OF THE CROSSWIND DISPERSION COEFFICIENT BY THE TIME DEPENDENT BEHAVIOR OF THE STANDARD DEVIATION OF THE WIND DIRECTION. THE METHOD HAS BEEN INCORPORATED AS AN OPTION IN THE SRD DISPERSION-AND-CONSEQUENCE PROGRAM TIRION. A NUMBER OF GRAPHS ARE PRESENTED ILLUSTRATING THE BEHAVIOR OF THE METHOD IN ALL SIX PASQUILL WEATHER CATEGORIES, BOTH WITH AND WITHOUT PLUME DEPLETION BY DEPOSITION. THESE RESULTS ARE PRESENTED IN TERMS OF NORMALIZED CONCENTRATION VS DISTANCE.

AVAILABILITY - THE EDITOR, UNITED KINGDOM ATOMIC ENERGY AUTHORITY, SAFETY AND RELIABILITY DIRECTORATE, CULCHETH, WARRINGTON WA3 4NE, ENGLAND

JACOBS + ANALYTICAL TECHNIQUE + *COMPUTER PROGRAM, METEOROLOGICAL + *DISPERSION + *AIRBORNE RELEASE - WIND + WIND PROFILE

17. OPERATIONAL SAFETY AND EXPERIENCE

116400
CONTE F
ONE YEAR OF PHENIX OPERATION
CEA CENTRE DE MARCOULE, FRANCE
ORNL-TR-4004 + CONF-750411-84 +. 19 PPS. FROM EUROPEAN NUCLEAR CONFERENCE; PARIS, FRANCE, APRIL 21, 1975
(TRANSLATION OF FRENCH REPORT)

A CHRONOLOGICAL DESCRIPTION IS ACCOMPANIED BY DIAGRAMS FOR TIMES UP UNTIL THE END OF MARCH 1975, PRODUCTION STATISTICS, MAIN OPERATING VARIABLES AT DIFFERENT STATES, AND A SUMMARY OF THE INCIDENTS THAT HAVE OCCURRED DURING USE. FROM THESE ELEMENTS CHARGE RATES AND AVAILABILITY OF 78% AND 81% WITH A GROSS OUTPUT GREATER THAN 45% ARE FOUND. THE CHIEF SUBASSEMBLIES OF THE STATION ARE REVIEWED WITH DETAILS OF POSSIBLE INCIDENTS, MODIFICATIONS MADE, AND PARTIAL CONCLUSIONS THAT CAN BE DRAWN. IN PARTICULAR, PROBLEMS OF FUEL, BLOCK REACTOR STRUCTURES, SODIUM PUMPS, CLAD RUPTURE DETECTION, STEAM GENERATORS, SODIUM CIRCUITS, AND ENERGY PRODUCTION INSTALLATIONS ARE ENUMERATED. IN GENERAL, PERFORMANCE OF THE INSTALLATION AND VALUES PREDICTED HAVE BEEN IN GOOD AGREEMENT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FUEL HANDLING + OPERATING EXPERIENCE + PUMPS + COMPONENTS + PHENIX (LMFBR) + REACTOR, LMFBR + SODIUM + TRANSPORTATION AND HANDLING + INSTRUMENT, FAILED FUEL DETECTION + STEAM GENERATOR

118532
NEGY JM + CONTE F + NOEL H + GODET J
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE
COMMISSARIAT A L'ENERGIE ATOMIQUE, FRANCE + ELECTRICITE DE FRANCE, PARIS
7 PPS, 3 TABS, COMBUSTION, 47(12), PP. 25-31 (JUNE 1976)

THE OBJECTIVE WAS TO CONFIRM THE VALIDITY AND RELIABILITY OF THE ENTIRE SYSTEM BY SHOWING THAT IT WAS POSSIBLE TO BUILD A FAST-NEUTRON POWER PLANT AND TO OPERATE IT SATISFACTORILY. PRELIMINARY STUDIES STARTED IN 1965 CONSTRUCTION AND FABRICATION STARTED IN 1969. CONSTRUCTION WORK WAS PRACTICALLY COMPLETED IN 1972, AND CRITICALITY WAS ACHIEVED IN AUGUST 1973. THE AVAILABILITY FACTOR FOR 1975 WAS 70.26%. THE OVERALL INSTALLATION DEMONSTRATES ALMOST PERFECT STABILITY BOTH WITH RESPECT TO THE REACTOR AND THE BALANCE OF THE PLANT. OPERATOR INTERVENTIONS ARE INFREQUENT. AN EXAMINATION OF THIS SURVEY SHOWS THAT LAUNCHING THE CONSTRUCTION OF SUPER PHENIX HAS EXCELLENT CHANCES OF SUCCESS.

REACTOR, LMFBR + PHENIX (LMFBR) + CONSTRUCTION + TESTING + OPERATION + COMPONENTS

121474
SMITH CRF + HOLMES JT
PURITY OF EBR-II SODIUM: 1967-1974
ARGONNE NATIONAL LABORATORY, ILLINOIS
ANL-75-26 +. 145 PPS, 18 TABS, 79 FIGS, DEC. 1975

THIS REPORT CONSOLIDATES ALL INFORMATION AVAILABLE ON RADIOMETRIC AND CHEMICAL ANALYSES MADE ON SODIUM IN EBR-II FOR 1967-1974. SYSTEMS, EQUIPMENT, AND TECHNIQUES USED FOR SAMPLING THE SODIUM ARE DESCRIBED AND EVALUATED. THE BEST METHODS FOR MEASURING HYDROGEN, CARBON, AND OXYGEN IN SODIUM ARE (1) THE HYDROGEN-DIFFUSION METER; (2) EQUILIBRATION OF LOW-CARBON STAINLESS STEEL TABS WITH SODIUM; AND (3) EQUILIBRATION OF VANADIUM WIRES WITH SODIUM RESPECTIVELY. ELECTROCHEMICAL OXYGEN METERS ARE USEFUL FOR CONTINUOUS MEASUREMENT OF OXYGEN IN SODIUM, BUT THEY NEED TO BE RECALIBRATED BY VANADIUM-WIRE EQUILIBRATION APPROXIMATELY MONTHLY. SPECIAL TECHNIQUES ARE USED FOR ANALYZING FOR IMPURITIES THAT (1) SEGREGATE FROM SODIUM DURING SAMPLE COOLING (E.G., 3H, 131I, AND 137CS) OR (2) VOLATILIZE DURING DISTILLATION OF SODIUM SAMPLES (E.G., HYDROGEN, CADMIUM, AND ZINC).

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

FILTER, TRAP + IMPURITY + SAMPLING + ANALYTICAL TECHNIQUE + EBR 1 AND 2 (RE) + REACTOR, LMFBR + SODIUM + TRITIUM + HYDROGEN + OXYGEN + CARBON + CESIUM + JACOBS

121754
CLARK AF + HOBLES RG + BUSCHMAN HW
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE SEALS - 1969-1975
ARGONNE NATIONAL LABORATORY, ILLINOIS
ANL-75-10 +. 66 PPS, 7 TABS, 37 FIGS, MARCH 1976

THE EBR-II ROTATING-PLUG FREEZE SEALS HAVE CONTINUED TO FULFILL THE DESIGN REQUIREMENTS OF ACTING AS A BLANKET-GAS SEAL WHILE PROVIDING A SOLID MECHANICAL SEAL DURING REACTOR POWER RUNS AND A MOVABLE LIQUID SEAL DURING FUEL HANDLING. OPERATION OF THE SEALS HAS NOT BEEN TROUBLE-FREE, AND MODIFICATIONS WERE MADE TO IMPROVE OPERATION AND MAINTENANCE. SINCE 1969, EXTENSIVE CHANGES WERE MADE IN THE TEMPERATURE CONTROL OF THE SEALS IN ORDER TO REDUCE THE MAINTENANCE EFFORT AND IMPROVE THE OPERATIONAL CHARACTERISTICS OF THE SYSTEM.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

JACOBS + *OPERATING EXPERIENCE SUMMARY + *SEAL + EBR 1 AND 2 (RE) + REACTOR, LMFBR + MODIFICATION + MAINTENANCE AND REPAIR + ANL

122830
UNITED KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST BREEDER REACTOR
3 PPS. ELECTRIC PERSPECTIVES. 77(1). PP. 19-21 (JAN. 1977)

HERE, BY WAY OF PROVIDING A PERSPECTIVE ON FAST BREEDER REACTORS GENERALLY, IS A REVIEW OF THE BRITISH EXPERIENCE SO FAR.

UNITED KINGDOM + *REACTOR, FAST + REACTOR, BREEDER + PFR (LMFR) + DOUNREAY (LMFBR) + *REACTOR, LMFBR + N-POWER FORECAST + *OPERATING EXPERIENCE

124369
OLDS FC
BRITAIN'S PROTOTYPE FAST REACTOR
8 PPS. 5 FIGS. POWER ENGINEERING. 81(3). PP. 38-43 (MARCH 1977)

PFR IS A 250-MWE SODIUM-COOLED FAST BREEDER REACTOR OF THE POOL DESIGN. IT IS THE THIRD PROTOTYPE FAST REACTOR NOW IN SERVICE IN THE WORLD. THE BRITISH DEVELOPED PFR AS A SELF-SUSTAINING FAST BREEDER SYSTEM. IT HAS A COMPLETE FUEL CYCLE FROM FABRICATION TO REPROCESSING AND WASTE MANAGEMENT. SUPPORT FACILITIES, RED. PUBLIC HEALTH, SAFETY, SAFEGUARDS AND FUEL TRANSPORT ARE INCLUDED. PFR'S NNUCLEAR SIDE HAS BEEN RUNNING WITH AN AVAILABILITY OF OVER 90%, BUT CONVENTIONAL SIDE PROBLEMS HAVE BEEN A STEADY AGGRAVATION. TROUBLES AND ALL, HOWEVER, KNOWLEDGE FROM PFR IS UNDERPINNING THE CONCEPTS AND DESIGNS FOR THE ONCOMING COMMERCIAL FBR SYSTEMS

UNITED KINGDOM + *REACTOR, FAST + *REVIEW + PFR (LMFR) + DOUNREAY (LMFBR) + REACTOR, LMFBR + OPERATING EXPERIENCE + *DESIGN STUDY + SAFETY ANALYSIS + FUEL CYCLE

124616
DELPEYROUX P + BALLOFFET Y + BLANCHARD P + CARTERET Y
CHARACTERISTICS AND BEHAVIOUR OF THE PHENIX FUEL ELEMENT
COMMISSARIAT A L'ENERGIE ATOMIQUE, FRANCE
IAEA-CN-36/268 +. 14 PPS. FROM INTERNATIONAL CONFERENCE ON NUCLEAR POWER AND ITS FUEL CYCLE: SALZBURG, AUSTRIA, MAY 2-13, 1977

RECALLS BRIEFLY THE DESCRIPTION OF THE FUEL ELEMENT AND SUBASSEMBLY AND THE RUNNING CONDITIONS WHICH WERE FORESEEN FOR THE START-UP; THEN SHOWS HOW IT WAS POSSIBLE, BY THE WAY OF A RATHER SIMPLE QUALIFICATION PROGRAM, TO INCREASE THE ORIGINAL BURNUP. DESCRIBES THE BEHAVIOR OF THE MIXED OXIDE AND ITS INTERACTION WITH THE CLADDING AS WELL AS THE STRAINS IN CLADDING AND HEXAGONAL WRAPPERS, STRAINS WHICH MAKE UP, FROM THE RESULTS OF HOT-CELL EXAMINATIONS, THE FIRST END-OF-LIFE LIMIT EXPECTED TO MEET. DISCUSSES THE EXCELLENT FIABILITY OF THE FUEL ELEMENT.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*BEHAVIOR + REACTOR, LMFBR + FRANCE + PHENIX (LMFBR) + FUEL BURNUP + COMPONENT DESCRIPTION + CLADDING + MIXED OXIDE + OPERATING EXPERIENCE + *FUEL ELEMENTS

124943
COOPER WW
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION
AMERICAN NUCLEAR SOCIETY
CONF-760503-P1 +. 466 PPS. MEETING HELD IN CHAMPION, PA., MAY 3-6, 1976

THE FIRST SESSIONS CONTAINED THE FOLLOWING: OPERATING REACTOR; LOOP OPERATIONS; FRICTION WEAR, AND SELF-WELDING; FREE ELECTRON NOTES; STEAM GENERATOR; RADIOACTIVE CORROSION AND FISSION PRODUCT TRANSPORT; EFFECTS OF SODIUM ON MECHANICAL PROPERTIES; CORROSION AND ADVANCED APPLICATIONS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FILTER, TRAP + CORROSION + HIGH TEMPERATURE + WEAR + WELDS + EMBRITTLEMENT + REACTOR, LMFBR + OPERATING EXPERIENCE + SODIUM + THERMODYNAMICS + PROPERTY, MECHANICAL + STEAM GENERATOR + JACOBS + OUT OF PILE EXPERIMENT

126181
CHOPRA PS + STONE CC + HUTTER E
FAIL-SAFETY OF THE EBR-II STEAM GENERATOR
ARGONNE NATIONAL LAB., ILL.
CONF-760503-6 +. 10 PPS. FROM INTERNATIONAL CONFERENCE ON LIQUIFIED METAL TECHNOLOGY IN ENERGY PRODUCTION: CHAMPION, PA., MAY 3, 1976

FAIL-SAFE ANALYSES OF THE EBR-II STEAM-GENERATOR SYSTEM SHOW THAT A POSTULATED NON-INSTANTANEOUS LEAK OF WATER OR STEAM INTO SODIUM, THROUGH A DUPLEX TUBE OR A TUBESHEET, AT CREDIBLE LEAK RATES WILL NOT STRUCTURALLY DAMAGE THE EVAPORATERS AND SUPERHEATERS. HOWEVER, CONTAMINATION OF THE SYSTEM AND POSSIBLE SHELL WASTAGE BY SODIUM WATER REACTION PRODUCTS MAY RENDER THE SYSTEM INOPERABLE FOR A PERIOD EXCEEDING 6 MONTHS. THIS PERIOD WOULD BE SHORTENED TO 3 MONTHS IF THE SYSTEM WERE MODIFIED BY ADDING A REMOTELY OPERATED WATER DUMP SYSTEM, A STEAM VENT SYSTEM, A SECONDARY SODIUM SUPERHEATER RELIEF LINE, AND A TUBESHEET LEAK-DETECTION SYSTEM.

EBR 1 AND 2 (RE) + REACTOR, RESEARCH + *STEAM GENERATOR + LEAK + SODIUM + METAL WATER REACTION + *CONTAMINATION + SAFETY ANALYSIS + REACTOR, LMFBR

126673
CLAUZON PP + COULON P + PENET P
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX
CENTRE D'ETUDES NUCLEAIRES DE CADARACHE, FRANCE
CONF-761001(VOL. 1) +. 15 PPS. PP. 61-75 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

PHENIX HAS BEEN IN OPERATION FOR OVER 2 YEARS AND THE INFORMATION FOR CORE SAFETY ANALYSIS DERIVED FROM ITS OPERATION CAN BE DIVIDED IN 2 AREAS. FIRST, AT NOMINAL STATE OF THE CORE, THE COMPARISON BETWEEN OBSERVED PHYSICAL PROPERTIES AT START-UP AND DURING ITS LIFE AND THE CORRESPONDING CALCULATIONS GIVES SUPPORT TO THE SAFETY EVALUATION. FURTHER, THE CORE BEHAVIOR OF PHENIX HAS BEEN ANALYZED ON 2 ASPECTS: ITS NEUTRONIC FEEDBACKS TO THE MAIN POSSIBLE PERTURBATIONS OF ITS PHYSICAL STATE, AND ITS CAPABILITY OF NATURAL SODIUM CONVECTION IN CASE OF PUMP COAST DOWN.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

PHENIX (LMFBR) + REACTOR, LMFBR + REACTOR STARTUP EXPERIENCE + PROPERTY, PHYSICAL + COMPARISON, THEORY AND EXPERIENCE + PERTURBATION METHOD + REACTOR PHYSICS + HEAT TRANSFER, CONVECTION

127246
SMITH RN + CISSEL DW + SMITH RR
EBR-II OPERATING EXPERIENCE
ARGONNE NATIONAL LAB., IDAHO FALLS
47 PPS. FROM ANS 8TH BIENNIAL TOPICAL CONFERENCE ON REACTOR OPERATING EXPERIENCE; CHATTANOOGA, TENN., AUG. 7-10, 1977

AS ORIGINALLY DESIGNED AND OPERATED, EBR-II SUCCESSFULLY DEMONSTRATED THE CONCEPT OF A SODIUM-COOLED FAST BREEDER POWER PLANT WITH A CLOSED FUEL REPROCESSING CYCLE (MINI-NUCLEAR PARK). SUBSEQUENT OPERATION HAS BEEN AS AN IRRADIATION FACILITY. SINCE THE BEGINNING OF OPERATION IN 1961, OPERATING EXPERIENCE OF EBR-II HAS BEEN VERY SATISFACTORY. TO DATE, NO FAILURES OR INCIDENTS RESULTING IN SERIOUS IN-CORE OR OUT-OF-CORE CONSEQUENCES HAVE OCCURRED. NO WATER-TO-SODIUM LEAKS HAVE BEEN DETECTED OVER THE LIFE OF THE PLANT. A PLANT FACTOR OF 76.9% WAS ACHIEVED FOR THE CALENDAR YEAR 1976.

AVAILABILITY - R. N. SMITH, EBR-II PROJECT, ARGONNE NATIONAL LAB., P.O. BOX 2528, IDAHO FALLS, IDAHO 83401

*EBR 1 AND 2 (RE) + REACTOR, LMFBR + REACTOR, TEST + OPERATING EXPERIENCE SUMMARY + *OPERATING EXPERIENCE + IRRADIATION TESTING + REACTOR DESCRIPTION

127247
MEGY J + CONTE F + GODDET J
THREE YEARS OF PHENIX OPERATION
COMMISSARIAT A L'ENERGIE ATOMIQUE, FRANCE + ELECTRICITE DE FRANCE, MARCOULE
11 PPS. FROM ANS 8TH BIENNIAL TOPICAL CONFERENCE ON REACTOR EXPERIENCE; CHATANOOGA, TENN., AUG. 7-10, 1977

PHENIX IS A SODIUM-COOLED FAST NEUTRON BREEDER PROTOTYPE REACTOR, 250 MWE. IT IS LOCATED ON THE MARCOULS CENTER IN SOUTHERN FRANCE. CONSTRUCTION WAS STARTED IN 1968 AND WAS COMPLETED AT THE END OF 1973, AND IT BECAME COMMERCIALLY OPERATIONAL IN JULY 1974. OPERATING EXPERIENCE AND DATA ACCUMULATED DURING THE FIRST THREE YEARS ARE PRESENTED. ALSO DISCUSSED IS THE PROBLEM EXPERIENCED WITH THE INTERMEDIATE HEAT EXCHANGERS AND THE CORRECTIVE MEASURES TAKEN.

AVAILABILITY - AMERICAN NUCLEAR SOCIETY, 244 E. OGDEN AVE., HINSDALE, ILL. 60521

*PHENIX (LMFBR) + REACTOR, LMFBR + *OPERATING EXPERIENCE SUMMARY + OPERATING EXPERIENCE + MAINTENANCE AND REPAIR + REACTOR DESCRIPTION + DATA PROCESSING + HEAT EXCHANGERS

127315
BULT PR
PROPOSALS FOR IN-SERVICE INSPECTION AND MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED FAST REACTORS
23 PPS. PAPER PRESENTED AT IAEA MEETING ON IN-SERVICE INSPECTION; BENSBERG, GERMANY, MARCH 1976

DESIGN AND OPERATIONAL EXPERIENCE OF CEGB GAS COOLED REACTORS AND CERTAIN OVERSEAS REACTOR PLANTS ARE REVIEWED IN RELATION TO IN-SERVICE INSPECTION AND MONITORING CAPABILITIES. DESIGN GUIDELINES AND PRELIMINARY PROPOSALS ARE GIVEN FOR IN-SERVICE INSPECTION AND MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED FAST REACTORS. SPECIFIC COMMENTS ARE MADE ON THE ITEMS OF FURTHER DESIGN AND DEVELOPMENT WORK BELIEVED TO BE NECESSARY. A LIST OF FAILURES AND DETERIORATION PROCESSES THAT HAVE OCCURRED ON FAST AND THERMAL REACTORS IS APPENDED.

AVAILABILITY - UNIPUB, INC., P.O. BOX 433, NEW YORK, N.Y. 10016

*INSERVICE INSPECTION + REACTOR, LMFBR + REACTOR, GCR + REVIEW + OPERATING EXPERIENCE + FAILURE, EQUIPMENT

128323
SACKETT JI + GALE NL
DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR EBR-II: SOME CONSIDERATIONS FOR APPLICATION TO COMMERCIAL LMFBR'S

128323 *CONTINUED*
ARGONNE NATIONAL LAB., ILL.
CONF-761001(VOL. II) +. 9 PPS. PP. 411-19. FROM PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

CONSIDERATIONS MADE IN DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR EBR-II IDENTIFIED OPERATIONAL-SAFETY CONCERNS UNIQUE TO LMFBR'S AND APPLICABLE TO BOTH MAJOR REACTOR TEST FACILITIES AND PROTOTYPE COMMERCIAL PLANTS. TECH SPECS DEVELOPED FOR EBR-II DEFINE THE SAFE OPERATING ENVELOPE WHILE AT THE SAME TIME PROVIDING THE FLEXIBILITY TO ACCOMMODATE A WIDE RANGE OF TESTS RELEVANT TO FAST REACTOR SAFETY. THIS REQUIRED, IN MANY CASES, DEFINITION OF PERFORMANCE CRITERIA RATHER THAN SPECIFIC OPERATING LIMITS. MUCH CONSIDERATION WAS GIVEN TO DIFFERENTIATING BETWEEN ITEMS TRULY RELEVANT TO PERSONNEL SAFETY AND THOSE RELEVANT ONLY TO REACTOR AVAILABILITY.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*EBR 1 AND 2 (RE) + *TECHNICAL SPECIFICATIONS + OPERATION + ADMINISTRATIVE CONTROL + SAFETY ANALYSIS + REACTOR, LMFBR + REACTOR, TEST

129708
MAFFEI MP + FUNK CW + BALLIF JL
SODIUM REMOVAL, DISASSEMBLY, AND EXAMINATION OF FERMI SECONDARY SODIUM PUMP
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TC-133 +. 28 PPS. 3 TABS. 13 FIGS. AUG. 1974

IN DEVELOPING THE WATER-VAPOR-NITROGEN SODIUM REMOVAL PROCESS, THE DEMONSTRATION OF THE PROCESS ON ACTUAL PLANT COMPONENTS PROVIDES USEFUL EXPERIENCE AND INFORMATION. SEVERAL PLANT-SCALE COMPONENTS INCLUDING FERMI 3-IN. BELLOWS SEALS VALUES HAVE BEEN SUCCESSFULLY CLEANED. RECENTLY, A 13,000 GPM FERMI SECONDARY PUMP WAS PROCESSED AND THE RESULTS ARE DESCRIBED IN THIS REPORT.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

SODIUM + RECOVERY PROCESS + PUMPS + FERMI (LMFBR) + REACTOR, LMFBR + EXPANSION + PIPES AND PIPE FITTINGS + SEAL + COOLING SYSTEM, SECONDARY

130967
MOFFITT WC
FFTF OPERATIONS: INITIAL OPERATOR TRAINING SIMULATOR PROGRAM
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-SA-1129 + CONF-761099-1 +. 9 PPS. FROM IAEA SPECIALISTS MEETING; STUDSVIK, SWEDEN, OCT. 27, 1976

DESCRIBES THE FFTF OPERATIONS INITIAL TRAINING PROGRAM UTILIZING THE OPERATOR TRAINING SIMULATOR, A COMPUTER-DRIVEN SYSTEM THAT PROVIDES REAL TIME RESPONSE OF ESSENTIAL PLANT FUNCTIONS TO A CONTROL ROOM MOCKUP. THE FFTF, A 400 MEGAWATT, THREE-LOOP, SODIUM-COOLED FAST TEST REACTOR WILL TEST FUELS, MATERIALS AND EQUIPMENT FOR THE U.S. LIQUID METAL FAST BREEDER REACTOR PROGRAM. CONSTRUCTION IS EXPECTED TO BE COMPLETED IN AUGUST 1978. INITIAL CRITICALITY IS EXPECTED IN EARLY 1979. THIS SCHEDULE WILL REQUIRE FFTF CONTROL ROOM OPERATORS TO BE FULLY QUALIFIED TO OPERATE THE FACILITY BY LATE 1979.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*TRAINING + OPERATION + REACTOR, TEST + REACTOR, LMFBR + SIMULATION + FFTF (TR)

18. DESIGN, CONSTRUCTION AND LICENSING

119864
RESPONSE TO QUESTION 001.398 - RELEASE OF FISSION PRODUCTS DURING CLEANING OF LARGE COMPONENTS
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-173 +, 1 PG, P. Q001.398-1 OF AMENDMENT 23 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JUNE 30, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

THE UNCONTROLLED OR RUNAWAY REACTION OF SODIUM WITH WATER AND RESULTANT HYDROGEN GENERATION IN THE LARGE COMPONENT CLEANING VESSEL (LCCV) IS DEFINED AS AN 'EXTREMELY UNLIKELY EVENT'. THE POSTULATED ACCIDENT WOULD BE A RESULT OF A FAILURE, MALFUNCTION, OR OPERATOR ERROR BUT NEVERTHELESS CAN BE USED TO EVALUATE THE DESIGN BASIS FOR THE VESSEL. THE RESPONSE TO QUESTION 001.201 DESCRIBES HOW REGULATION OF WATER VAPOR CONCENTRATION IN THE WATER VAPOR NITROGEN (WVN) MIXTURE INTRODUCED IN THE CLEANING VESSEL AND REGULATION OF NITROGEN PURGE RATE WILL CONTROL THE HYDROGEN CONCENTRATION IN THE PRIMARY SODIUM REMOVAL AND DECONTAMINATION (PSR+D) SYSTEM.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *FISSION PRODUCT RELEASE + *DECONTAMINATION + COMPONENTS + METAL WATER REACTION + METAL, LIQUID + ACCIDENT + ACCIDENT, PROBABILITY OF

119866
RESPONSE TO QUESTION 001.406 - NATURAL CIRCULATION DECAY HEAT REMOVAL
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-173 +, 1 PG, P. Q001.406-1 OF AMENDMENT 23 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JUNE 30, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

THE CRBRP PROJECT IS COMMITTED TO NATURAL CIRCULATION DECAY HEAT REMOVAL AS A DESIGN REQUIREMENT FROM RATED THERMAL POWER (975 MW (SUB T)) ON THREE LOOPS. THE PLAN TO ESTABLISH THE CAPABILITY FOR REMOVAL OF SENSIBLE AND DECAY HEAT VIA NATURAL CIRCULATION IS DEFINED IN A REPORT TITLED 'VERIFICATION OF NATURAL CIRCULATION IN CLINCH RIVER BREEDER REACTOR - A PLAN', WHICH HAS BEEN SUPPLIED UNDER SEPARATE COVER.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + DESIGN CRITERIA + DECAY HEAT + *SHUTDOWN COOLING SYSTEM + *CIRCULATION, NATURAL

119868
RESPONSE TO QUESTION 001.427 - RELIABILITY ASSESSMENT FOR PIPE SLEEVES
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-173 +, 1 PG, P. Q001.427-1 OF AMENDMENT 23 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JUNE 30, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

THE PIPE SLEEVE DESIGN WILL BE SUCH THAT ADEQUATE INSPECTABILITY WILL BE PROVIDED, AS DELINEATED IN APPENDIX E. THE STRUCTURAL DESIGN OF THE PIPE SLEEVE WILL EMPLOY WELL ESTABLISHED DETERMINISTIC ANALYSIS AND DESIGN METHODS. UNDER THE DESIGN BASIS PIPE BREAK CONDITIONS, THE DESIGN OF THE PIPE SLEEVE WILL ASSURE ITS STRUCTURAL INTEGRITY NECESSARY TO PERFORM ITS SPECIFIED SAFETY FUNCTION. THEREFORE, WE DO NOT PLAN TO PERFORM A 'DETAILED RELIABILITY ASSESSMENT FOR THE PIPE SLEEVE DESIGN'.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *PIPES AND PIPE FITTINGS + *CONTAINMENT + ACCIDENT ANALYSIS + DESIGN CRITERIA + INSERVICE INSPECTION + *RELIABILITY ANALYSIS

119876
RESPONSE TO QUESTION 222.40 - INCORPORATION OF A MARGIN OF ERROR IN PREDICTIONS
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-173 +, 1 PG, P. Q222.40-1 OF AMENDMENT 23 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JUNE 30, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

PROBABILITY DENSITY FUNCTIONS WILL BE GENERATED TO PROVIDE A BASIS FOR DEFINING UNCERTAINTIES ASSOCIATED WITH THE VARIOUS SYSTEM ELEMENTS. THESE DISTRIBUTIONS WILL BE FORMED BY COMBINING APPLICABLE EXISTING DATA WITH DATA GENERATED WITHIN THE RELIABILITY PROGRAM. BECAUSE OF PRACTICAL CONSIDERATIONS, IT WILL NOT BE POSSIBLE TO GENERATE TOP LEVEL DISTRIBUTIONS SOLELY FROM EXPERIMENTAL DATA ON PROTOTYPIC HARDWARE. FOR EXAMPLE, LARGE SCALE TESTING IN AN IRRADIATION ENVIRONMENT WILL NOT BE PERFORMED. INSTEAD DATA FROM IRRADIATED SMALL SAMPLES WILL BE USED.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *RELIABILITY ANALYSIS + TESTING + MODEL TESTING + *SAFETY MARGIN

119877
RESPONSE TO QUESTION 222.47 - SHUTDOWN SYSTEM COMPONENT FAILURE
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-173 +, 1 PG, 1 TAB, PP. Q222.47-1 THRU Q222.47-3 OF AMENDMENT 23 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JUNE 30, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

119877 *CONTINUED*

THE ITEMS ANALYZED IN THE ELECTRICAL PROTECTIVE SYSTEM FMEA ARE LISTED IN THE ATTACHED TABLE WITH THEIR ASSOCIATED FAILURE RATE ESTIMATES AS DESCRIBED IN ATTACHED TABLE 222.47-1. WHEN AN ITEM IS FOUND FAILED THE PROCEDURE WILL BE TO TRIP THE CHANNEL IN WHICH THE FAILED ITEM IS LOCATED. THE ITEM CAN THEN BE REPAIRED. AFTER THE REPAIR IS COMPLETED, THE TRIP WILL THEN BE REMOVED. THUS, DURING THE PERIOD IN WHICH THE ITEM IS REPAIRED, THE 2 OF 3 SYSTEM IS EFFECTIVELY OPERATING AS A 1 OF 2 SYSTEM.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *FAILURE MODE ANALYSIS + REACTOR PROTECTION SYSTEM + *CONTROL SYSTEM + MAINTENANCE AND REPAIR + COMPONENTS

119899
RESPONSE TO QUESTION 310.32 - SODIUM FIRE EFFECT ON CONTROL ROOM HABITABILITY
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-175 +, 2 PGS, PP. Q310.32-1 THRU Q310.32-2 OF AMENDMENT 24 TO CLINCH RIVER BREEDER LICENSE APPLICATION, JULY 22, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

THE RELEASE OF SODIUM AND SUBSEQUENT SODIUM FIRES RESULTING IN THE RELEASE OF SODIUM COMBUSTION PRODUCTS TO THE ATMOSPHERE IS DESCRIBED IN SECTION 7.2.1.1 OF THE ENVIRONMENTAL REPORT. A PRELIMINARY ANALYSIS WAS CONDUCTED TO DETERMINE THE EFFECT OF THE RELEASE OF THESE PRODUCTS TO THE ATMOSPHERE ON THE HABITABILITY OF THE CONTROL ROOM IN ACCORDANCE WITH REGULATORY GUIDE 1.78. AT THE TIME OF THE SODIUM RELEASE AND START OF THE FIRE, ANY ONE OF 3 TYPES OF SENSORS, WHICH ARE LOCATED IN NON-INERTED CELLS CONTAINING SODIUM, WILL INITIATE AN ALARM IN THE CONTROL ROOM AND ACTIVATE THE EMERGENCY OPERATING MODE OF THE CONTROL ROOM HVAC SYSTEM.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *SODIUM + *FIRE + VENTILATION SYSTEM + *CONTROL PANEL/ROOM + EFFECT + CONTROL SYSTEM

120928
RESPONSE TO QUESTION Q11.14 - BOTTLING OF AR-39 AND KR-85 FROM CRYOGENIC STILL
CLINCH RIVER BREEDER REACTOR PLANT PROJECT OFFICE, OAK RIDGE, TN
DOCKET 50537-183 +, 2 PGS, PP. Q011.14-1 THRU Q011.14-2 OF AMENDMENT 25 TO CLINCH RIVER BREEDER LICENSE APPLICATION, AUG. 13, 1976, DOCKET 50-537, TYPE--LMFBR, MFG--WEST., AE--BURNS & ROE

THE CRYOGENIC STILL BOTTOMS CONSIST OF LIQUID ARGON IN WHICH KRYPTON AND XENON ISOTOPES WHICH PASS THRUGH THE CRYOGENIC CHARCOAL BEDS DISSOLVE. THE CRYOSTILL SERVES TO COLLECT AND REMOVE KRYPTON AND XENON ISOTOPES - STABLE AS WELL AS RADIOACTIVE - IN THE RECYCLE GAS STREAM. DURING STEADY STATE OPERATION WITH 1% FAILED FUEL, THE CRYOSTILL BOTTOMS WILL ACCUMULATE 2.0 CURIES/DAY OF KR-85 AND ABOUT 0.01 CURIES/DAY OF AR-39. IT HAS BEEN DETERMINED THAT IF THE STILL WERE OPERATED FOR 10 YEARS, THE ONE CUBIC FOOT OF LIQUID ARGON WOULD CONTAIN 5.377 CURIES OF KR-85, 26 CURIES OF AR-39 AND 0.05 CURIES OF AR-41. THIS WILL FILL 52 1.5 CU. FT. LABORATORY-SIZED GAS BOTTLES AT 150 PSIA. A TOTAL OF 104 CURIES IN EACH BOTTLE.

AVAILABILITY - MAGNAGARD, INC., P.O. BOX 3501, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + RESPONSE TO NRC QUESTION + *WASTE TREATMENT + *WASTE TREATMENT, GAS + WASTE STORAGE + *CRYOGENICS + SYSTEM CAPABILITY + SYSTEM DESCRIPTION + ARGON + KRYPTON + OFF GAS

121273
FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION AND OPERATION OF CLINCH RIVER BREEDER
U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON
NUREG-0139 +, APPROX. 410 PPS. TABS. FIGS. REFS. FEB. 1977 (DOCKET 50-537)

THE PROPOSED LOCATION IS IN ROANE COUNTY, TENN., ABOUT 25 MILES WEST OF KNOXVILLE. CRITICALITY IS NOW SCHEDULED FOR OCT. 1983. DURING THE FIRST 5 YEARS OF OPERATION, TVA WOULD OPERATE THE CRBR AND PURCHASE ITS ELECTRICAL OUTPUT AS A DEMONSTRATION PLANT UNDER ERDA'S LMFBR PROGRAM. TVA WOULD THEN HAVE THE OPTION TO PURCHASE THE PLANT. THE CRBR IS DESIGNED TO PRODUCE 975 MWT (380MWE). FUTURE CORE DESIGNS MAY RESULT IN POWER RATINGS OF 1121 MWT AND 439 MWE - THESE HIGHER RATINGS WERE CONSIDERED IN THIS ASSESSMENT. EXHAUST STEAM IS TO BE COOLED USING 2 MECHANICAL DRAFT COOLING TOWERS. ABOUT 20,000 CUBIC METERS OF RIVER BANK AND BOTTOM WOULD BE EXCAVATED TO INSTALL THE COOLING WATER INTAKE AND DISCHARGE AND BARGE UNLOADING FACILITIES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*CLINCH RIVER (LMFBR) + *STATEMENT, ENVIRONMENTAL + CONSTRUCTION PERMIT PROCESS + COOLING TOWER, MECHANICAL + MAIN COOLING SYSTEM + INTAKE + ECOSYSTEM + TVA + POWER UPRATING + REACTOR, LMFBR

121581
FRANGOS AZ
FFTF HTS/DHX PROTOTYPE MODULE TESTING IN SCTI FINAL REPORT
ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.
LMEC-76-4 +, 360 PPS. 18 TABS. 84 FIGS. OCT. 30, 1976

THIS REPORT COVERS TESTING OF THE FULL-SIZE PROTOTYPE MODULE HEAT TRANSFER SYSTEM/DUMP HEAT EXCHANGER (HTS/DHX). ONE OF TWELVE UNITS TO BE INSTALLED FOR THE FAST FLUX TEST FACILITY (FFTF)

121581 *CONTINUED*

AT HANFORD, WASHINGTON. THE OVERALL OBJECTIVES OF THE HTS/DHX TEST PROGRAM AT LIQUID METAL ENGINEERING CENTER (LMEC) WERE TO DEMONSTRATE STEADY-STATE AND TRANSIENT PERFORMANCE OF THE FULL-SIZED PROTOTYPE MODULE IN A SODIUM LOOP UNDER SIMULATED FFTF PROCESS CONDITIONS AND TO VERIFY DHX INSTALLATION, STARTUP, AND MAINTENANCE PROCEDURES. STEADY-STATE TESTING INDICATED A DEFICIENCY IN THE THERMAL PERFORMANCE. A TWO-PHASE PROGRAM WAS COMPLETED TO INCREASE PERFORMANCE TO DESIGN REQUIREMENTS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

REACTOR, SAFETY RESEARCH + TESTING + COMPONENTS + HEAT TRANSFER, TWO PHASE + HEAT TRANSFER + FFTF (TR) + REACTOR, LMFBR + FIRE + SODIUM + JACOBS

122108
APOSTOLAKIS GE + CAVE L + EPLER EP + ILBERG D + KASTENBERG WE
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976
UNIVERSITY OF CALIFORNIA, LOS ANGELES (PREPARED FOR NRC)
NUREG-0148 + UCLA-ENG-76116 +. 104 PPS, JAN. 1977

THE RELIABILITY PROGRAM WHICH WAS ESTABLISHED FOR THE CLINCH RIVER FAST BREEDER REACTOR PROJECT IS REVIEWED. THE REVIEW REVEALS SEVERAL PROBLEMS AND UNCERTAINTIES WHICH NEED TO BE APPROPRIATELY ADDRESSED BY THE RELIABILITY PROGRAM. THE MAIN PROBLEMS ARE STATED TO BE THE CHOICE OF THE RELIABILITY CRITERION, THE PROSPECTS OF ATTAINING HIGH RELIABILITIES OF SYSTEMS AND CRITICAL STRUCTURES, THE ROLE OF EXTERNAL PHENOMENA AS WELL AS THE VERIFICATION BY TESTS AND THE RELIABILITY ASSURANCE PROGRAM.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

JACOBS + RELIABILITY ANALYSIS + REACTOR, LMFBR + CLINCH RIVER (LMFBR) + REVIEW + *DESIGN CRITERIA + *QUALITY ASSURANCE

126126
DONALDSON AM
HEAT REJECTION FOR THE CLINCH RIVER BREEDER REACTOR PLANT
BURNS & ROE INC.
20 PPS, PAPER NO. 146, FROM 39TH ANNUAL MEETING OF THE AMERICAN POWER CONFERENCE; CHICAGO, ILL., APRIL 18-20, 1977

THE CRBRP INCORPORATES A REGENERATIVE FEEDWATER HEATING CYCLE HEATING THE CONDENSATE FROM THE MAIN CONDENSER. THE MAIN CONDENSER IS COOLED BY CIRCULATING WATER FROM THE COOLING SYSTEM. THE COOLING SYSTEM PROVIDES THE MECHANISM FOR DISSIPATION OF THE TURBINE EXHAUST STEAM'S THERMAL ENERGY. THIS PAPER DETAILS THE OPTIMIZATION AND SELECTION OF THE FOLLOWING COOLING SYSTEMS: MECHANICAL DRAFT WET TOWER, MECHANICAL DRAFT WET/DRY TOWER, HYPERBOLIC OR NATURAL DRAFT TOWER AND A SPRAY POND.

AVAILABILITY - ANDREW M. DONALDSON, MECHANICAL GROUP, BURNS & ROE INC, 9800 S. SEPULVEDA BLVD., LOS ANGELES, CALIF.

*CLINCH RIVER (LMFBR) + REACTOR, LMFBR + CONDENSER COOLING SYSTEM + WASTE HEAT + COOLING TOWER, MECHANICAL + COOLING TOWER, NATURAL DRAFT + COOLING POND + *WASTE HEAT MANAGEMENT

125973
MCCONNELL PM
CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE FLOW TESTS
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
HEDL-TME 77-6 +. 108 PPS, 8 TABS, 39 FIGS, FEB. 1977

FULL SCALE MODEL COMPONENTS OF THE CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLIES HAVE BEEN TESTED UNDER STEADY-FLOW CONDITIONS WITH 140 DEG F WATER. SHIELD ORIFICE CALIBRATION DATA (23 CONFIGURATIONS), INLET-NOZZLE PISTON-RING LEAKAGE, EFFECTS OF FUEL ASSEMBLY INLET-NOZZLE UNSEATING, AXIAL VELOCITY PROFILES, AND ROUGH CAVITATION THRESHOLD CHECKS ARE REPORTED. THESE DATA PERMIT THE DESIGNER TO ACCURATELY PREDICT THE THERMAL HYDRAULIC PERFORMANCE OF THE PROTOTYPE FUEL ASSEMBLIES FOR A GIVEN SET OF DESIGN CONDITIONS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

REACTOR, LMFBR + OUT OF PILE EXPERIMENT + FLOW THEORY AND EXPERIMENTS + DESIGN CRITERIA + HYDRAULIC EXPERIMENT + JACOBS + WESTINGHOUSE + CLINCH RIVER (LMFBR)

126176
TZANOS CP + BARTHOLD WP + BOWERS CH
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS
ARGONNE NATIONAL LAB., ILL.
CONF-761001-43 +. 18 PPS, FROM INTERNATIONAL MEETING ON FAST REACTOR SAFETY & RELATED PHYSICS; CHICAGO, ILL., OCT. 1976

DESIGN-RELATED SAFETY-ENHANCING FEATURES SUCH AS (1) EXTENDED PUMP COASTDOWN, (2) INCREASED

126179 *CONTINUED*
NEGATIVE REACTIVITY FEEDBACKS, (3) REDUCED SODIUM VOID REACTIVITY, AND (4) SELF-ACTUATED SHUTDOWN SYSTEMS ARE EVALUATED. PRIMARY EMPHASIS IS PLACED ON PREVENTING OR LIMITING CORE DAMAGE. ATTENTION IS ALSO GIVEN TO FEATURES AIMED AT MITIGATION OF THE ENERGETICS POTENTIAL OF HYPOTHETICAL CORE-DISRUPTIVE ACCIDENTS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + *SAFETY ANALYSIS + PUMPS + TRANSIENT + REACTIVITY, NEGATIVE + REACTIVITY EFFECT, VOID + SHUTDOWN MECHANISM, SELF + ACCIDENT, CORE DISRUPTIVE

127503
CONCEPTUAL DESIGN DESCRIPTION, 3000-KWE SUBSEA NUCLEAR POWER PLANT
ATOMICS INTERNATIONAL, CANOGA PARK, CALIF.
AI-FRDA-13194 +, 79 PPS, 22 TABS, 22 FIGS, APRIL 15, 1977

DESCRIBES THE CONCEPTUAL DESIGN AND PERFORMANCE OF A SUBSEA NUCLEAR POWER SYSTEM FOR APPLICATION IN OFFSHORE OIL AND GAS PRODUCTION. THE SYSTEM IS DESIGNED TO PROVIDE 3000 KW(E) POWER TO OIL PUMPS, AT 4160 V, AND 60 HZ, FOR A PERIOD OF 4 YEARS, IN AN AUTOMATIC, UNATTENDED MODE. THE NUCLEAR POWER SYSTEM IS LARGELY CONTAINED WITHIN TWO SEPARATE PRESSURE VESSELS, CONNECTED BY AN ENCLOSED PIPE CHASE. ONE VESSEL CONTAINS THE REACTOR AND LIQUID METAL PRIMARY COOLANT SYSTEM, WHILE THE OTHER CONTAINS THE ORGANIC RANKINE POWER CONVERSION SYSTEMS. THESE MODULES ARE MOUNTED ON A BARGE WHICH PROVIDES BOTH A MEANS TO TRANSPORT THE SYSTEM AND A MOUNTING STRUCTURE FOR THE SEA FLOOR INSTALLATION. A WASTE HEAT EXCHANGER IS MOUNTED ON THE DECK OF THE BARGE. THE NUCLEAR POWER SYSTEM IS DESIGNED FOR UNATTENDED OPERATIONS.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*POWER PLANT, NUCLEAR + SITING, OFF SHORE + *CONTAINMENT, UNDERWATER + DESIGN STUDY + REACTOR, LMCR + REACTOR, ORGANIC COOLED + JACOBS

127511
LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY
ATOMICS INTERNATIONAL + BURNS & ROE INC.
TID-27701-1(VOL.1) + FBR-77-3 +, 106 PPS, 11 TABS, 23 FIGS, MAY 1977

THIS VOLUME PRESENTS A SYNOPSIS OF THE CONCEPTUAL DESIGN AND PERFORMANCE CHARACTERISTICS OF A 1000-MWE LMFBR ELECTRIC-GENERATING POWER PLANT. THIS CONCEPTUAL DESIGN WAS DEVELOPED BY THE ATOMICS INTERNATIONAL AND BURNS & ROE TEAM DURING THE SECOND PHASE OF THE PROTOTYPE LARGE BREEDER REACTOR DESIGN PROJECT. PHASE I TEAM EFFORTS DEVELOPED CONCEPTUAL DESIGNS OF 1000-MWE LMFBR POWER PLANTS UTILIZING "LOOP," "POOL," AND "HYBRID" PRIMARY SYSTEM ARRANGEMENTS. PHASE II EFFORTS CONCENTRATED ON THE ENGINEERING ASPECTS OF THE LOOP CONCEPT. THE REACTOR CORE UTILIZES PUO2-UO2 FUEL AND UO2 BREEDER ELEMENTS, IN A "BULLSEYE" CONFIGURATION, TO IMPROVE OVERALL BREEDING, FUEL CYCLE ECONOMICS, AND SAFETY CHARACTERISTICS.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO UOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

*REACTOR, LMFBR + *DESIGN STUDY + URANIUM DIOXIDE + PLUTONIUM DIOXIDE + JACOBS + REACTOR DESCRIPTION

129205
PRISLINGER JJ + JONES RH
FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-5733 +, 17 PPS, 8 FIGS, MAY 1977

THE PROCEDURE USED IN FABRICATING AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY IS DESCRIBED. SUPERIOR PERFORMANCE IS ACCOMPLISHED AT REDUCED COST WITH ADHERENCE TO THE ASME BOILER AND PRESSURE VESSEL CODE. THE TECHNIQUES USED AND THE METHOD OF FABRICATION ARE DESCRIBED IN DETAIL.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

FABRICATION + PROCEDURES AND MANUALS + HEAT EXCHANGERS + REACTOR TEST FACILITY + REACTOR, LMFBR + FAILURE, FUEL ELEMENT + ORNL

129737
KOJIMA T + YASUHITO O + TATSUTOSHI
STUDIES, DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST BREEDER REACTORS IN JAPAN
7 PPS, GENSHIRYOKU KOGYO., 22(9), PP. 40-46 (SEPT.-OCT. 1976)

OUTLINES THE RESEARCH AND DEVELOPMENT WORK IN JAPAN ASSOCIATED WITH THE FAST BREEDER REACTOR. PROGRESS ON THE CONSTRUCTION OF THE EXPERIMENTAL REACTOR JOYO AND PLANNED CONSTRUCTION OF THE PROTOTYPE REACTOR, MONJU, IS DISCUSSED. DISCUSSES THE DESIGN AND ROLE OF A 3600 MWT (1500 MWE) COMMERCIAL FAST BREEDER REACTOR IN A NUCLEAR POWER PROGRAM.

*JAPAN + *R AND D PROGRAM + REACTOR, FAST + REACTOR, LMFBR + REACTOR DESCRIPTION + REACTOR, TEST + CONSTRUCTION + GROWTH/DEVELOPMENT + REACTOR, BREEDER

129918
ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS
STONE & WEBSTER ENGINEERING CORP., BOSTON, MASS.
TID-27690/3 +. 580 PPS. 31 TABS. 61 FIGS. JUNE 1977

CONTAINS A DESCRIPTION OF THE PROTOTYPE LARGE BREEDER REACTOR (PLBR) DESIGN AS IT EXISTED AT THE COMPLETION OF PHASE II ACTIVITY. THE REPORT IS ORGANIZED IN THE GENERAL FORMAT OF A PRELIMINARY SAFETY ANALYSIS REPORT. THE DESIGN INFORMATION AND DATA CONTAINED IN THIS PLANT DESCRIPTION ARE OF A PRELIMINARY NATURE AND SUBJECT TO CHANGE AS THE DESIGN PROGRESSES. SOME DATA ARE ESTIMATES ONLY AND ARE PROVIDED TO PRESENT AN OVERALL DESIGN DESCRIPTION. THE PLBR NUCLEAR POWER PLANT INCLUDES A NUCLEAR STEAM SUPPLY SYSTEM, TURBINE GENERATOR, THEIR AUXILIARIES AND OTHER ONSITE FACILITIES, AND THE NECESSARY AUXILIARIES REQUIRED FOR A COMMERCIAL OPERATING LMFBR POWER PLANT.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

AGENCY, ERDA + EPRI + *DESIGN STUDY + *REACTOR, LMFBR + REACTOR DESCRIPTION + CONTAINMENT DESIGN + ELECTRIC POWER + WASTE DISPOSAL + RADIATION SAFETY AND CONTROL + ENGINEERED SAFETY FEATURE

129944
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM DESIGN DESCRIPTION
BURNS & DOE INC., BRADELL, N.J.
SDD-15(REV.2) +. APPROX. 90 PPS. TABS. FIGS. AUG. 5, 1977

THE CLINCH RIVER BREEDER REACTOR PLANT COMMUNICATIONS SYSTEM SHALL PROVIDE CAPABILITIES FOR INTRA-PLANT COMMUNICATION AND FOR INTER-PLANT COMMUNICATION WITH TVA SUBSTATIONS, GENERATING AND POWER CONTROL FACILITIES, DURING NORMAL AND EMERGENCY OPERATION OF THE PLANT. THIS SYSTEM SHALL ALSO SUPPORT PLANT OPERATIONS, MAINTENANCE AND BUSINESS FUNCTIONS DURING NORMAL OPERATION AND PROVIDE MEANS OF COMMUNICATING WARNINGS AND ALARMS TO THE PLANT-PERSONNEL AND OTHER TVA FACILITIES DURING AN EMERGENCY.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

CLINCH RIVER (LMFBR) + REACTOR, LMFBR + DESIGN CRITERIA + *COMMUNICATION SYSTEM + COMMUNICATION + *SYSTEM DESCRIPTION + EMERGENCY PROCEDURE

129945
CHA BK + FULFORD PJ + HUEBOTTER PR
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED CORE RESTRAINT SYSTEM
ARGONNE NATIONAL LAB., ILL.
ANL-CT-78-52 +. 114 PPS. 21 TABS. 45 FIGS. 19 REFS. AUG. 1978

AN ADVANCED CORE RESTRAINT SYSTEM PROPOSED AND BRIEFLY DESCRIBED IN ANL-CT-78-44 IS INVESTIGATED IN A SERIES OF CALCULATIONS. FIRST BACKGROUND INFORMATION ON THE CONCEPT IS PROVIDED AND AN OUTLINE OF THE STUDY IS GIVEN. THE INITIAL STUDIES EXAMINE THE THREE-POINT SUPPORT CONCEPT IN THE ELASTIC REGIME AND DISCUSS THE CAPABILITIES AND SHORT-COMINGS. THE VARIOUS METHODS OF TREATING INELASTIC BEHAVIOR (CREEP AND SWELLING) ARE PRESENTED; THEY INCLUDE A SINGLE DUCT METHOD, A FULL 2D METHOD AND A 2D TREATMENT IN WHICH ONLY ONE ROW OF DUCTS BEHAVES INELASTICALLY AND THE REST BEHAVE ELASTICALLY.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

REACTOR, LMFBR + *CORE RESTRAINT + *CREEP BEHAVIOR + *SWELLING + ANALYTICAL MODEL + MATHEMATICAL TREATMENT + DESIGN STUDY + ANL

130876
PROTOTYPE LARGE BREEDER REACTOR, PHASE III: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT ENGINEERING SUPPORT STUDIES
GENERAL ELECTRIC CO. + BECHTEL CORP.
TID-27,745/8 + ETR-8 +. APPROX. 510 PPS. TABS. FIGS. REFS. JUNE 1977

TOPICS DISCUSSED INCLUDE THE REACTOR CONTAINMENT STRUCTURE AND CONCEPT STUDY, OTHER CATEGORY I STRUCTURES, SEISMIC ANALYSIS, CELL LINERS, PLANT CRANE STUDY, TURBINE CONDENSER SIZING STUDY, IMPACT ON BOP OF ALTERNATIVE DECAY HEAT REMOVAL SYSTEMS, RECIRCULATING GAS COOLING SYSTEM ALTERNATIVE, EFFECTS OF INTERMEDIATE HEAT TRANSPORT SYSTEM PIPE PENETRATIONS ON BOP DESIGN, SODIUM LEAK DETECTION, PIPING STRESS ANALYSIS, AND PIPE HEATING SYSTEM STUDY.

AVAILABILITY - LIMITATIONS ON DISTRIBUTION; SEND REQUESTS TO DOE TECHNICAL INFORMATION CENTER, P.O. BOX 62, OAK RIDGE, TENN. 37830

DESIGN STUDY + REACTOR, LMFBR + CONTAINMENT DESIGN + CONTAINMENT STRUCTURE + CONTAINMENT LINER + CRANE + PLBR (LMFBR) + CONDENSER + SHUTDOWN COOLING SYSTEM + SODIUM + LEAK DETECTION + STRESS ANALYSIS + PIPES AND PIPE FITTINGS

22. SAFEGUARDS OF NUCLEAR MATERIALS

124774
1976 ASME - ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR ENERGY SYSTEMS
641 PPS. PROCEEDINGS PUBLISHED BY AMERICAN SOCIETY OF MECHANICAL ENGINEERS. 1976

THIS 3 DAY MEETING WHICH WAS HELD IN PITTSBURG, PA. IN MARCH 1976 WAS DEVOTED TO A BROAD REVIEW OF ALL ADVANCED NUCLEAR SYSTEMS. SESSION TOPICS INCLUDED LMFBR CONSTRUCTION AND OPERATING EXPERIENCE; ADVANCED DEVELOPMENT IN THERMAL REACTORS; ENVIRONMENTAL ASPECTS OF ADVANCED REACTOR SYSTEMS; LMFBR COOLANT SYSTEM COMPONENTS; ADVANCED REACTOR SYSTEMS; SAFETY OF BREEDER REACTORS; NONELECTRIC NUCLEAR ENERGY; LMFBR REACTOR SYSTEM COMPONENTS; FUSION REACTOR PROGRAMS; COMMERCIAL LMFBR DESIGNS; GAS-COOLED REACTOR COMPONENTS; SITING, LICENSING AND SAFEGUARDS FOR BREEDER REACTORS.

AVAILABILITY - AMERICAN SOCIETY OF MECHANICAL ENGINEERS, 345 E. 47TH ST., NEW YORK, N.Y. 10017

*REACTOR, LMFBR + CONSTRUCTION + OPERATING EXPERIENCE + COMPONENTS + REACTOR, THERMAL + ENVIRONMENTAL QUALITY + N-POWER, SAFETY OF + *REACTOR, BREEDER + SITING, REACTOR + LICENSING PROCESS + REACTOR, THERMONUCLEAR + REACTOR, GCR + SAFEGUARDS, NUCLEAR MATERIAL

126675
TRAUBE K
SAFETY DESIGN OF SNR-300
INTERATOM, BENSBERG, GERMANY
CONF-761001(VOL. 1) +. 15 PPS. PP. 84-98 OF THE PROCEEDINGS OF THE INTERNATIONAL MEETING ON FAST REACTOR SAFETY AND RELATED PHYSICS; CHICAGO, ILL., OCT. 5-8, 1976

THIS JOINT GERMAN-BELGIAN-DUTCH LOOP TYPE 300 MWE LMFBR PROTOTYPE REACTOR IS BEING CONSTRUCTED ON LOWER RHINE AT KALKAR, GERMANY. THIS PAPER DEALS WITH THREE IMPORTANT SAFETY ISSUES: HYPOTHETICAL CORE DISRUPTIVE ACCIDENT (HCDA), PROTECTION AGAINST EXTERNAL EVENTS (PLANE CRASHES, SABOTAGE, MISSILES, EARTHQUAKES), AND PROVISIONS FOR INSERVICE INSPECTION.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*REACTOR, LMFBR + GERMANY + SAFETY ANALYSIS + ACCIDENT, CORE DISRUPTIVE + CONTAINMENT INTEGRITY + AIRCRAFT + EARTHQUAKE + SABOTAGE + INSERVICE INSPECTION

129975
POWERS PN
THE NUCLEAR POWER DILEMMA
PURDUE UNIV., WEST LAFAYETTE, IND.
6 PPS. NATIONAL DEFENSE, 61(342), PP. 483-86 (MAY-JUNE 1977)

THE COSTLY SLOWDOWN IN BUILDING THE U.S. NUCLEAR POWER INDUSTRY IS BECOMING A DANGEROUS THREAT TO NATIONAL SECURITY. THE DELAY IS COSTLY BECAUSE IT INCREASES THE PRICE OF ELECTRICITY. AND IT IS DANGEROUS BECAUSE IT GIVES ENCOURAGEMENT TO THE SPREAD OF FACILITIES AROUND THE WORLD WITH CAPABILITIES FOR PRODUCING MATERIAL FOR NUCLEAR WEAPONS. OTHER NATIONS ARE RELYING LESS ON OUR LEADERSHIP IN NUCLEAR MATTERS, AND OUR STRENGTH IS THREATENED BY ENERGY CRISES SUCH AS THOSE OF 1973 AND 1977 WHICH ARE LIKELY TO BECOME MORE FREQUENT AND MORE SEVERE AND WHICH COULD BE MINIMIZED BY A RAPID INCREASE IN OUR ELECTRIC-GENERATING CAPACITY.

ENERGY + ELECTRIC POWER + POWER PLANT, NUCLEAR + LICENSING PROCESS + COST, CAPITAL + REACTOR, BREEDER + PROLIFERATION

131030
SPIEWAK I + BARTINE DE
THORIUM ASSESSMENT STUDY QUARTERLY PROGRESS REPORT FOR THIRD QUARTER FISCAL 1977
OAK RIDGE NATIONAL LAB., TENN.
ORNL/TM-6025 +. 52 PPS. 24 TABS. 8 FIGS. 15 REFS. OCT. 1977

REPORTS PROGRESS ON THE PROGRAM AIMED AT ASSESSING THE POTENTIAL ROLE OF THORIUM FUEL CYCLES FOR ALLEVIATING SAFEGUARDS CONCERNS. SCENARIOS INCLUDE (1) NO FUEL RECYCLE PERMITTED, (2) FUEL RECYCLE PERMITTED ONLY IN SECURE REGIONS ("ENERGY PARKS") WITH DENATURED (CHEMICALLY NON-SEPARABLE) FUELS ONLY OUTSIDE THESE REGIONS, AND (3) NO LIMITS ON FUEL RECYCLE. A FURTHER OBJECTIVE IS TO PROVIDE NUCLEAR MASS BALANCE DATA ON HTGRS REQUIRED BY ERDA CONTRACTORS FOR COMPARATIVE COST-BENEFIT STUDIES.

AVAILABILITY - NATIONAL TECHNICAL INFORMATION SERVICE, U. S. DEPARTMENT OF COMMERCE, SPRINGFIELD, VA. 22161

*THORIUM + *FUEL CYCLE + SAFEGUARDS, NUCLEAR MATERIAL + FUEL RECYCLE + REACTOR, HTGR + COST BENEFIT + REACTOR, FAST + REACTOR, LMFBR

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KEYWORD INDEX

A COLLECTION OF KEYWORDS IS USED TO DENOTE THE MAIN SAFETY RELATED POINTS COVERED IN EACH ARTICLE. THE FOLLOWING INDEX IS AN ALPHABETICAL LISTING OF THE KEYWORDS GIVING REFERENCES TO EACH ARTICLE WHICH WAS KEYED TO IT.

ACCIDENT
119864 P 46
ACCIDENT ANALYSIS
124601 P 4 126672 P 5 124041 P 9 126864 P 12
129632 P 17 125644 P 17 120360 P 19 121042 P 22
126085 P 22 126656 P 23 130653 P 23 130653 P 34
126085 P 36 127818 P 37 130854 P 37 119868 P 46
ACCIDENT MODEL
126864 P 12 125644 P 17
ACCIDENT, CONSEQUENCES
126672 P 5 129502 P 14 129901 P 15 127818 P 37
ACCIDENT, CORE DISRUPTIVE
124601 P 4 126672 P 5 120963 P 10 122103 P 11
122810 P 11 124281 P 11 125688 P 12 129502 P 14
129901 P 15 122579 P 16 123318 P 15 125632 P 17
126176 P 17 129908 P 18 130429 P 18 127992 P 21
123729 P 22 126085 P 22 127923 P 22 128320 P 23
126656 P 23 130653 P 23 120378 P 29 120625 P 29
121729 P 29 124597 P 30 127820 P 33 126326 P 33
126659 P 34 129931 P 34 130653 P 34 121729 P 36
126085 P 36 127818 P 37 130894 P 37 126176 P 49
126675 P 51
ACCIDENT, CRITICALITY
128320 P 23 126656 P 23
ACCIDENT, FUEL SLUMP
130829 P 15
ACCIDENT, HYPOTHETICAL
126688 P 12 123197 P 16 125632 P 17 125644 P 17
130829 P 18 127992 P 21 120378 P 29 121729 P 29
126597 P 30 127820 P 33 121729 P 36
ACCIDENT, LOSS OF COOLANT
119262 P 1 126085 P 22 126085 P 36 130854 P 37
ACCIDENT, LOSS OF FLOW
120341 P 10 122810 P 11 129504 P 14 125644 P 17
128320 P 23 129931 P 34
ACCIDENT, LOSS OF POWER
124318 P 28
ACCIDENT, LOSS OF PRESSURE
120341 P 10
ACCIDENT, PROBABILITY OF
130854 P 37 119864 P 46
ACCIDENT, TRANSPORTATION
124041 P 9
ACOUSTICS
126416 P 26
ACTINIDE
120966 P 38
ADMINISTRATIVE CONTROL
128323 P 44
AEROSOL
130829 P 18 128340 P 19 121014 P 19 127992 P 21
129276 P 21 129277 P 21 121014 P 36
AEROSOL, RADIOACTIVE
130653 P 23 128326 P 33 130653 P 34
AGENCY, ERDA
121108 P 2 121108 P 38 129918 P 50
AGGLOMERATE
129277 P 21
AIR CLEANING
121014 P 19 121014 P 36
AIRBORNE RELEASE
124561 P 20 130540 P 41
AIRCRAFT
126678 P 51
ALLOY
127484 P 32 127563 P 32
ANALYTICAL MODEL
124041 P 9 124281 P 11 123859 P 20 125653 P 20
129277 P 21 123720 P 22 120625 P 29 123913 P 30
130851 P 35 129945 P 50
ANALYTICAL TECHNIQUE
121735 P 10 121730 P 25 130540 P 41 121474 P 42
ANL
120963 P 10 122799 P 11 122810 P 11 129901 P 15
126416 P 20 121754 P 30 126529 P 31 129931 P 34
121754 P 42 129945 P 50
ARGON
127992 P 21 120928 P 47
ATMOSPHERIC DIFFUSION
124320 P 3
BEHAVIOR
122103 P 11 121630 P 24 124618 P 43
BENEFIT VS RISK
120096 P 1
BLOWDOWN
120360 P 19
BOILING
129804 P 14 129505 P 14
BROWNS FERRY 3 (BWR)
119262 P 1
BUBBLE
129900 P 18 127992 P 21
BUILDING
118397 P 41
CABLES AND CONNECTORS
123867 P 25
CANDU (HWR)
126692 P 5
CARBON
121474 P 42
CARBON DIOXIDE
121153 P 2
CESIUM
121474 P 42
CHARCOAL
121014 P 19 121014 P 36
CHROMIUM
127563 P 32
CIRCULATION, NATURAL
127686 P 13 129518 P 14 119866 P 46
CLADDING
126006 P 13 123859 P 20 118919 P 24 122592 P 30
130851 P 35 125292 P 39 124616 P 43
CLINCH RIVER (LMFBR)
122105 P 2 122825 P 2 123381 P 3 123704 P 3
126601 P 4 126453 P 5 127515 P 6 121327 P 10
122103 P 11 129258 P 12 129518 P 14 121642 P 22
127023 P 22 120320 P 23 122599 P 25 121641 P 29
127484 P 32 119864 P 46 119866 P 46 119868 P 46
119876 P 46 119877 P 46 119899 P 47 120928 P 47
121273 P 47 122105 P 48 124126 P 48 125573 P 48
129944 P 50
COAL
118533 P 1 118534 P 1 123230 P 3
COATED PARTICLE
128000 P 33
CODES AND STANDARDS
129276 P 21 127484 P 32
COMMUNICATION
129944 P 50
COMMUNICATION SYSTEM
129944 P 50
COMPARISON
125632 P 17 127484 P 32
COMPARISON, THEORY AND EXPERIENCE
122799 P 11 122810 P 11 124281 P 11 126864 P 12
126456 P 13 129504 P 14 124107 P 17 126673 P 18
121639 P 22 126659 P 34 126673 P 49
COMPARTMENT
124743 P 31
COMPONENT DESCRIPTION
126616 P 43
COMPONENTS
118532 P 1 120625 P 29 127504 P 32 130851 P 35
116400 P 42 118532 P 42 119864 P 46 119877 P 46
121581 P 47 124774 P 51
COMPOSITION
128000 P 33
COMPUTER PROGRAM
127612 P 9 120341 P 10 127484 P 13 126086 P 13
122579 P 16 130829 P 18 123899 P 20 121642 P 22
120378 P 29 120625 P 29 121641 P 29 122592 P 30
124743 P 31 130974 P 35 122830 P 38
COMPUTER PROGRAM, DIGITAL
120341 P 10 122799 P 11 122810 P 11 126864 P 12
126456 P 13 129502 P 14 129504 P 14 129901 P 15
121481 P 16 129508 P 18
COMPUTER PROGRAM, METEOROLOGICAL
130540 P 41
CONCRETE
120963 P 10
CONDENSATION
130653 P 23 130653 P 34
CONDENSER

130876 P 50
CONDENSER COOLING SYSTEM
124125 P 48
CONSERVATION
122020 P 2
CONSTRUCTION
118532 P 1 120530 P 4 118032 P 32 129737 P 47
124774 P 51
CONSTRUCTION PERMIT PROCESS
121273 P 47
CONTAINMENT
121014 P 19 123880 P 20 120378 P 29 127820 P 33
128326 P 33 121014 P 36 119068 P 46
CONTAINMENT ANALYSIS
127020 P 33 130854 P 37
CONTAINMENT DESIGN
127823 P 22 128326 P 33 129918 P 50 130876 P 50
CONTAINMENT INTEGRITY
126672 P 5 127823 P 22 130653 P 23 130853 P 36
127018 P 37 128675 P 51
CONTAINMENT LINER
130876 P 50
CONTAINMENT STRUCTURE
130876 P 50
CONTAINMENT VESSEL LOADING
127020 P 33 128326 P 33
CONTAINMENT, PRESSURE VENTING
128326 P 33
CONTAINMENT, UNDERWATER
127503 P 49
CONTAMINATION
126181 P 43
CONTROL PANEL/ROOM
119899 P 47
CONTROL SYSTEM
126483 P 5 127832 P 33 119877 P 46 119899 P 47
COOLANT CHEMISTRY
130874 P 15
COOLING POND
124126 P 48
COOLING SYSTEM, SECONDARY
129708 P 49
COOLING TOWER, MECHANICAL
121273 P 47 124126 P 48
COOLING TOWER, NATURAL DRAFT
124125 P 48
CORE
124927 P 25
CORE CATCHER
121729 P 29 121729 P 36
CORE COMPONENTS
127647 P 26
CORE MELTDOWN
124601 P 4 122103 P 11 124281 P 11 129901 P 15
122579 P 16 130629 P 18 123728 P 22 126095 P 22
128320 P 23 121729 P 29 126529 P 31 129931 P 34
121729 P 36 126085 P 36
CORE RESTRAINT
129948 P 50
CORRELATION
125258 P 12
CORROSION
125292 P 39 124963 P 43
COST BENEFIT
126357 P 39 131030 P 51
COST, CAPITAL
129978 P 51
COVER GAS
124989 P 38
CRACK
127506 P 32 127886 P 32
CRANE
130876 P 50
CREEP
120000 P 29 126289 P 31 127472 P 31 129405 P 34
130974 P 38
CREEP BEHAVIOR
127472 P 31 129948 P 50
CRITICALITY EXPERIMENT
124107 P 17
CROSS SECTION
121481 P 16
CRYOGENICS
120928 P 47
CYCLING
127503 P 32
DAMAGE
121630 P 24
DATA COLLECTION
120369 P 10
DATA PROCESSING
127247 P 44
DECAY HEAT
127612 P 9 130829 P 18 128085 P 22 124597 P 30
129931 P 34 126095 P 36 126148 P 41 119886 P 46
DECOMMISSIONING
119248 P 38
DECONTAMINATION
119193 P 19 119103 P 36 119248 P 38 119884 P 46
DEFORMATION
127472 P 31
DESIGN CRITERIA
122109 P 2 127515 P 6 127612 P 9 120349 P 10
120360 P 19 121014 P 19 121014 P 36 127918 P 37
119248 P 38 126989 P 39 119886 P 46 119868 P 46
122108 P 49 129973 P 48 129944 P 50
DESIGN STUDY
126453 P 5 130874 P 15 124369 P 43 127503 P 49
127511 P 49 129918 P 50 129948 P 50 130876 P 50
DIFFUSION
122979 P 16 128713 P 18
DISPERSION
130840 P 41
DISSOLUTION
127498 P 40
DISTRIBUTION
128000 P 13
DNB
130874 P 15
DOPPLER COEFFICIENT
123197 P 18
DOSE
130829 P 18
DOSE CALCULATION, EXTERNAL
121360 P 38
DOWNREAY (LMFBR)
122030 P 43 124369 P 43
DOWNWASH
118387 P 41
DROPLET
124743 P 31
EARTHQUAKE
126675 P 51
EARTHQUAKE ENGINEERING
126678 P 8
EGR 1 AND 2 (RE)
126416 P 26 121754 P 30 121474 P 42 121786 P 42
126181 P 43 127246 P 44 128323 P 44
ECONOMICS
118534 P 1 123704 P 3 124389 P 3 126907 P 6
128891 P 7
ECOSYSTEM
121273 P 47
EFFECT
119899 P 47
ELECTRIC ARC
127992 P 31
ELECTRIC POWER
118533 P 1 122043 P 28 129918 P 50 129978 P 51
ELECTRIC POWER, ALTERNATE
122043 P 28
ELECTRIC POWER, AUXILIARY
122043 P 28
ELECTRIC POWER, NORMAL
122043 P 28
ELECTRIC POWER, SHUTDOWN
122043 P 28
ELECTRIC POWER, UNINTERRUPTED
122043 P 28
ELECTRIC POWER, VITAL
122043 P 28
ELECTRICAL CONDUCTION
123967 P 26
ELECTRON MICROSCOPY
127503 P 32
ELECTRONIC FUNCTION UNITS
124927 P 25
EMBRITTLEMENT
124963 P 43
EMERGENCY COOLING SYSTEM
130854 P 37
EMERGENCY POWER, ELECTRIC
122043 P 28
EMERGENCY PROCEDURE
129944 P 50
ENERGY
121153 P 2 122625 P 2 123230 P 3 123381 P 3
124601 P 3 128891 P 7 129978 P 51
ENERGY LEVEL
120340 P 19
ENERGY SOURCE
124885 P 4

ENERGY SPECTRUM
126713 P 16
ENGINEERED SAFETY FEATURE
127818 P 37 129918 P 50
ENRICHMENT FACILITY
124320 P 3
ENVIRONMENT
130829 P 18 127832 P 33
ENVIRONMENTAL QUALITY
124320 P 3 124774 P 41
EPRI
129918 P 50
EQUATION
126713 P 16
EQUATION OF STATE
122979 P 18 121738 P 25
EQUIPMENT DEVELOPMENT
124930 P 4 127835 P 19 121635 P 24
EXCURSION, LARGE
123318 P 16
EXPANSION
124320 P 3 125853 P 20 129708 P 45
EXPLOSION
123864 P 20
EXPLOSIVE, CONVENTIONAL
120378 P 29
FABRICATION
129900 P 33 129205 P 49
FABRICATION FACILITY
121348 P 38
FAILURE MODE ANALYSIS
119877 P 46
FAILURE, CLADDING
120340 P 19
FAILURE, COMMON MODE
121327 P 10
FAILURE, DESIGN ERROR
122559 P 25
FAILURE, EQUIPMENT
122043 P 28 127315 P 44
FAILURE, FUEL ELEMENT
120340 P 19 129205 P 49
FAILURE, OPERATOR ERROR
122759 P 25
FAILURE, PIPE
124864 P 12
FAILURE, PRESSURE VESSEL
126659 P 34
FATIGUE
120000 P 29 123913 P 30
FAULT TREE ANALYSIS
122043 P 28
FERMI (LMFBR)
129708 P 45
FFTF (TR)
123704 P 3 127823 P 22 122043 P 28 129292 P 39
130967 P 45 121981 P 47
FILTER, DED
121014 P 19 121014 P 36
FILTER, SAND
121014 P 19 121014 P 36
FILTER, TRAP
119193 P 19 119193 P 36 121474 P 42 124943 P 43
FILTERS
121014 P 19 123864 P 20 121014 P 36
FIRE
119252 P 1 126864 P 12 130829 P 18 123864 P 20
130856 P 37 119899 P 47 121581 P 47
FIRE PROTECTION
124041 P 9
FISSION GAS RELEASE
125453 P 20
FISSION PRODUCT RELEASE
120340 P 19 121014 P 19 123959 P 20 127992 P 21
121014 P 36 119804 P 46
FISSION PRODUCT TRANSPORT
120340 P 19 123859 P 20 130683 P 23 130853 P 34
FISSION PRODUCT, AIRBORNE
124541 P 20
FLAW
127586 P 32
FLOW
127835 P 19
FLOW BLOCKAGE
126672 P 5 120963 P 10 126452 P 13 129506 P 14
130829 P 18 129931 P 34
FLOW DISTRIBUTION
122799 P 1 124787 P 12 126452 P 13
FLOW THEORY AND EXPERIMENTS
122799 P 11 124787 P 12 121530 P 24 125973 P 45
FLOW, CROSS
122799 P 11
FLOW, MIXING
124787 P 12
FLOW, TWO PHASE
129504 P 14 129506 P 14 127838 P 19
FLUORIDE
127498 P 40
FORECAST
110533 P 1 121153 P 2 123230 P 3
FRACTURE TOUGHNESS
120000 P 29
FRANCE
122925 P 2 124636 P 4 128822 P 5 124616 P 43
FTR (TR)
129931 P 34
FUEL BURNUP
124616 P 43
FUEL CLAD INTERACTION
130974 P 35
FUEL COOLANT INTERACTION
126572 P 5 128656 P 22 130854 P 37
FUEL CYCLE
121108 P 2 124481 P 3 124404 P 4 129530 P 4
126908 P 6 123864 P 20 124597 P 30 129066 P 38
121108 P 38 124449 P 39 126357 P 39 129569 P 43
131030 P 51
FUEL ELEMENTS
120171 P 16 127606 P 33 130974 P 35 129816 P 43
FUEL HANDLING
124959 P 39 119400 P 42
FUEL MELTDOWN
120963 P 10 128810 P 11 129281 P 11 123728 P 22
126055 P 22 128529 P 31 126085 P 36
FUEL RECYCLE
124320 P 3 121348 P 38 122839 P 38 124969 P 39
125292 P 39 131030 P 51
FUEL REPROCESSING
121108 P 2 122621 P 2 124320 P 3 128413 P 6
123864 P 20 124541 P 20 119248 P 38 120966 P 38
121108 P 38 121348 P 38 122839 P 38 126449 P 39
124969 P 39 125292 P 39 127498 P 40
FUEL ROD
126006 P 13 120171 P 16 125653 P 20 130853 P 23
118919 P 24 122592 P 30 130653 P 34 130851 P 35
FUEL STORAGE
125292 P 39
FUEL SWELLING
122592 P 30
FUEL, FOSSIL
121153 P 2 123230 P 3 126908 P 6
FUEL, NUCLEAR
121153 P 2 124041 P 9 130851 P 35
FUSION
122621 P 2 130851 P 35
GAMMA
127863 P 32
GAS
124541 P 20
GENERAL ELECTRIC
127484 P 32 127606 P 33
GERMANY
129502 P 14 129504 P 14 129506 P 14 127647 P 26
124507 P 30 128326 P 33 126675 P 51
GLOVE BOX
129276 P 21
GROSS BETA
120340 P 19
GROSS GAMMA
120340 P 19
GROWTH/DEVELOPMENT
126670 P 5 129737 P 49
GUIDE
129276 P 21
HATCH 1 (GWR)
127832 P 33
HAZARDS ANALYSIS
129276 P 21
HEAT CONDUCTANCE, FUEL TO CLAD
129981 P 15 122592 P 30
HEAT EXCHANGERS
120340 P 19 120194 P 24 127247 P 44 129205 P 49
HEAT TRANSFER
120340 P 19 122103 P 11 120340 P 19 121581 P 47
HEAT TRANSFER ANALYSIS
122103 P 11 130874 P 15 130829 P 18
HEAT TRANSFER COEFFICIENT
125256 P 12
HEAT TRANSFER, CONVECTION
125256 P 12 126673 P 18 126673 P 44
HEAT TRANSFER, TWO PHASE
121581 P 47

HEAT TREATMENT
127604 P 32
HEIGHT OF RISE
124148 P 41
HIGH TEMPERATURE
121738 P 25 123867 P 25 124927 P 25 123913 P 20
125285 P 31 127472 P 31 124943 P 43
HUCK
120171 P 16 122579 P 16 124107 P 17 125632 P 17
120340 P 19 123859 P 20 127935 P 19 127992 P 21
129277 P 21 123728 P 22 126085 P 22 130653 P 23
130653 P 34 130974 P 35 126085 P 36
HOT CEL.
124989 P 39
HSST
120340 P 19
HYDRAULIC ANALYSIS
122579 P 16
HYDRAULIC EXPERIMENT
124787 P 12 125973 P 48
HYDRODYNAMIC ANALYSIS
126608 P 12
HYDROGEN
119193 P 19 120154 P 24 121634 P 24 121635 P 24
119193 P 36 121274 P 42
IMPURITY
121474 P 42
IN PILE EXPERIMENT
122810 P 11 129504 P 14 123318 P 16
INDUSTRY, NUCLEAR
123381 P 3 129524 P 7
INSERVICE INSPECTION
127315 P 44 119866 P 46 126675 P 51
INSTRUMENT, CONTROL
127832 P 33
INSTRUMENT, FAILED FUEL DETECTION
116409 P 42
INSTRUMENT, FLOW
127635 P 19
INSTRUMENT, FLUIDICS
120349 P 10 124927 P 25
INSTRUMENT, IN CORE
127647 P 26 128969 P 26
INSTRUMENT, LIQUID LEVEL
129239 P 27
INSTRUMENT, NUCLEAR
123867 P 25
INSTRUMENT, SURVEILLANCE
124927 P 25
INSULATION
123867 P 25
INTAKE
121273 P 47
INTERACTION, SOIL AND STRUCTURE
127604 P 8
IODINE
124541 P 20
IRON
127583 P 32
IRRADIATION TESTING
126416 P 26 130851 P 35 127246 P 44
JACOBS
120096 P 1 122105 P 2 127515 P 6 127604 P 8
124041 P 9 127612 P 9 120963 P 10 121327 P 10
121735 P 10 122103 P 11 122810 P 11 124787 P 12
125258 P 12 127684 P 13 128452 P 13 129510 P 14
120171 P 16 121481 P 16 122579 P 16 123197 P 16
124107 P 17 125644 P 17 129508 P 18 130829 P 19
121014 P 19 123859 P 20 123886 P 20 125683 P 20
127992 P 21 129277 P 21 121639 P 22 121642 P 22
123728 P 22 126085 P 22 130653 P 23 121630 P 24
121634 P 24 121635 P 24 121738 P 25 122559 P 25
123867 P 25 124927 P 25 122043 P 28 120000 P 29
121041 P 29 121729 P 29 121754 P 30 123913 P 30
127472 P 31 127484 P 32 127586 P 32 127583 P 32
127585 P 32 127686 P 33 127320 P 33 129405 P 34
129931 P 34 130853 P 34 121014 P 36 121729 P 36
126085 P 36 121348 P 34 122539 P 38 124989 P 39
127498 P 40 130840 P 41 121474 P 42 121754 P 42
124943 P 43 121881 P 47 122108 P 48 125973 P 48
127503 P 49 127511 P 49
JAPAN
124481 P 3 128859 P 34 129737 P 49
KRYPTON
120928 P 47
LAPSE RATE, ADIABATIC, NEUTRAL
118387 P 41
LASER
121738 P 25
LEAK
121630 P 24 124743 P 31 127586 P 32 126181 P 43
LEAK DETECTION
127515 P 6 120154 P 24 121630 P 24 121634 P 24
121635 P 24 130876 P 50
LEGALISTICS
121108 P 2 121108 P 38
LICENSING PROCESS
124601 P 4 120320 P 23 124774 P 51 129978 P 51
LIQUID
120154 P 24
LITHIUM
121735 P 10
MAIN COOLING SYSTEM
130653 P 23 130653 P 34 121273 P 47
MAINTENANCE AND REPAIR
126453 P 5 121754 P 30 121754 P 42 127247 P 44
119877 P 46
MASS TRANSFER
125292 P 39
MATERIAL
127504 P 32 127686 P 33 130851 P 35
MATHEMATICAL STUDY
124107 P 17
MATHEMATICAL TREATMENT
120096 P 1 121481 P 16 129045 P 50
MEASUREMENT
127635 P 19 127647 P 26 129239 P 27
MEASUREMENT, TEMPERATURE
118919 P 24
METAL WATER REACTION
120340 P 19 121639 P 22 121642 P 22 127823 P 22
121641 P 29 126181 P 43 119866 P 46
METAL, LIQUID
120349 P 10 119864 P 46
METALLURGY
130851 P 35
METEOROLOGY
118387 P 41 124148 P 41
MIXED OXIDE
121348 P 38 127498 P 40 124616 P 43
MODEL TESTING
120378 P 29 119876 P 46
MODIFICATION
121754 P 30 121754 P 42
MOLTEN FUEL
122103 P 11
MONTE CARLO
124107 P 17
MOTORS
127832 P 33
N-POWER FORECAST
124320 P 3 124565 P 4 122630 P 43
N-POWER, SAFETY OF
119262 P 1 124320 P 3 128613 P 6 124774 P 51
NAK
120349 P 10
NICKEL
127583 P 32
NOISE ANALYSIS
126416 P 26
NRC-2
120340 P 19 127935 P 19
NRC-3
120340 P 19 123859 P 20
NRC-4
123859 P 20
NRC-5
120340 P 19
NRC-7
120171 P 16 122579 P 16 124107 P 17 125632 P 17
120340 P 19 127992 P 21 129277 P 21 123728 P 22
126085 P 22 130653 P 23 130653 P 34 130974 P 35
126085 P 36
NRC-8
120340 P 19
NSIC
120340 P 19
NUMERICAL METHOD
127484 P 32
OFF GAS
120928 P 47
OPERATING EXPERIENCE
124404 P 4 124530 P 4 116400 P 42 122830 P 43
126369 P 43 126016 P 43 126943 P 43 127246 P 44
127247 P 44 127315 P 44 124774 P 51
OPERATING EXPERIENCE SUMMARY
126870 P 5 121754 P 30 121754 P 42 127246 P 44
127247 P 44
OPERATION
110532 P 1 124530 P 4 128453 P 5 110532 P 42
128323 P 44 130967 P 45
OPERATOR ACTION

126483 P 5 122859 P 25
OPPONENT
123381 P 3
ORNL
124707 P 12 128452 P 13 127472 P 31 129205 P 49
OSCILLATION
124927 P 25
OUT OF PILE EXPERIMENT
120963 P 10 122799 P 11 124707 P 12 128452 P 13
129506 P 14 129518 P 14 126529 P 31 124943 P 43
129973 P 48
OXIDATION
120340 P 19
OXIDE
125277 P 21 121738 P 25
OXYGEN
121635 P 24 121474 P 42
PARAMETER
121481 P 16
PATENT
129239 P 27
PERFORMANCE
124505 P 4 120171 P 16 123867 P 25 121729 P 29
121729 P 36
PERTURBATION METHOD
126673 P 18 126673 P 44
PFR (LMFR)
124318 P 28 122830 P 43 124369 P 43
PHENIX (LMFBR)
118532 P 1 124494 P 4 126878 P 5 126622 P 6
126673 P 18 118400 P 42 118532 P 42 124816 P 43
126673 P 44 127267 P 44
PHOSPHATE
122839 P 33
PIPES AND PIPE FITTINGS
120340 P 19 120060 P 29 126743 P 31 127586 P 32
129708 P 45 119869 P 45 130878 P 50
PLBR (LMFBR)
130874 P 15 130876 P 50
PLUME BEHAVIOR
124148 P 41
PLUTONIUM
119262 P 1 124320 P 3 126908 P 6 128413 P 6
120881 P 7 121735 P 10 123864 P 20 127992 P 21
129276 P 21 119248 P 30 122830 P 35 126357 P 39
PLUTONIUM DIOXIDE
127498 P 49 127911 P 49
POPULATION EXPOSURE
121348 P 38
POWER PLANT, NUCLEAR
119262 P 1 122621 P 2 123230 P 3 126908 P 6
120622 P 6 120881 P 7 130851 P 35 126357 P 39
127503 P 49 129975 P 51
POWER UPRATING
121273 P 47
PRECIPITATION
127583 P 32
PRESSURE DROP
129506 P 14
PRESSURE PULSE
120379 P 29
PRESSURE RELIEF
121641 P 29
PRESSURE TRANSIENT
120341 P 10 124743 P 31
PRESSURE VESSELS
120379 P 29 130854 P 37
PROBABILITY
130829 P 18 122043 P 28
PROCEDURES AND MANUALS
126453 P 5 129205 P 49
PROLIFERATION
123381 P 3 124320 P 3 126908 P 6 128413 P 6
129975 P 51
PROMPT CRITICALITY
123318 P 16
PROPERTY, MECHANICAL
120000 P 29 126529 P 31 127686 P 33 126943 P 43
PROPERTY, PHYSICAL
126673 P 18 126673 P 44
PROPONENT
123381 P 3
PROTECTION SYSTEM
126334 P 26 128969 P 26
PUMPS
126176 P 17 118400 P 42 129708 P 45 126176 P 48
QUALIFICATION
127684 P 13 127832 P 33
QUALITY ASSURANCE
122105 P 2 122105 P 48
R AND D PROGRAM
118534 P 1 123704 P 3 124481 P 3 124530 P 4
126622 P 6 127684 P 13 128340 P 19 127992 P 21
126416 P 26 127472 P 31 127484 P 32 127506 P 32
127583 P 32 127586 P 32 127686 P 33 124449 P 39
129737 P 49
RADIATION DAMAGE
128006 P 13 127686 P 33 125292 P 39
RADIATION EFFECT
119262 P 1 127515 P 6
RADIATION SAFETY AND CONTROL
129918 P 50
RADIOACTIVITY RELEASE
124041 P 9 121348 P 38
RADIOLOGICAL IMPACT
127816 P 37
RADIOLYTIC GAS
124561 P 20
RAPSODIE (LMCR)
124494 P 4
REACTIVITY EFFECT
129508 P 16
REACTIVITY EFFECT, VOID
125644 P 17 126176 P 17 126176 P 48
REACTIVITY, NEGATIVE
126176 P 17 126176 P 48
REACTOR COOLANT
130874 P 15
REACTOR DESCRIPTION
124494 P 4 126870 P 5 124676 P 36 127246 P 44
127267 P 44 127511 P 49 129737 P 49 129918 P 50
REACTOR KINETICS
126713 P 18
REACTOR PHYSICS
126870 P 5 121481 P 16 122570 P 16 124107 P 17
126673 P 18 126713 P 18 126673 P 44
REACTOR PROTECTION SYSTEM
124318 P 28 119877 P 46
REACTOR STARTUP EXPERIENCE
126673 P 18 126673 P 44
REACTOR TEST FACILITY
127647 P 26 129205 P 49
REACTOR TRANSIENT
120171 P 16 123197 P 16
REACTOR, BREEDER
118533 P 1 119262 P 1 120096 P 1 121183 P 2
122621 P 2 122625 P 2 123230 P 3 123581 P 3
124320 P 3 124451 P 3 124494 P 4 126585 P 4
126692 P 5 126907 P 6 126908 P 6 128622 P 6
120881 P 7 129524 P 7 120341 P 10 121735 P 10
120171 P 16 126713 P 18 121738 P 25 127583 P 32
124676 P 36 126357 P 39 122830 P 43 129737 P 49
124776 P 51 129975 P 51
REACTOR, GAS
123859 P 28 127832 P 33 130854 P 37
REACTOR, FAST
120096 P 1 124481 P 3 124494 P 4 124530 P 4
128413 P 6 120881 P 7 121481 P 16 123197 P 16
126713 P 18 124676 P 36 130854 P 37 124449 P 39
122830 P 43 124369 P 43 129737 P 49 131030 P 51
REACTOR, GCFR
124568 P 4 129341 P 10 120963 P 10
REACTOR, GCR
124676 P 36 127315 P 44 124774 P 51
REACTOR, HTGR
120340 P 19 128000 P 33 125292 P 39 126357 P 39
131030 P 51
REACTOR, HWR
126357 P 39
REACTOR, LMCR
123197 P 16 127583 P 49
REACTOR, LMFBR
118532 P 1 118533 P 1 118534 P 1 121188 P 2
122135 P 2 123704 P 3 124494 P 4 124530 P 4
124601 P 4 126453 P 5 126672 P 5 126870 P 5
126907 P 6 127515 P 6 128413 P 6 126678 P 6
127604 P 8 124041 P 9 127612 P 9 120349 P 10
120963 P 10 121327 P 10 121735 P 10 122103 P 11
122799 P 11 122810 P 11 124281 P 11 124787 P 12
125256 P 12 126660 P 12 126806 P 12 127684 P 13
128006 P 13 128452 P 13 128806 P 13 129502 P 14
129504 P 14 129506 P 14 129518 P 14 129901 P 15
130874 P 15 120171 P 16 121481 P 16 122579 P 16
123318 P 16 124107 P 17 125632 P 17 125644 P 17
126176 P 17 126673 P 18 129508 P 18 130820 P 18
119193 P 19 120340 P 19 121014 P 19 123864 P 20
124561 P 20 129653 P 20 127992 P 21 129276 P 21
129277 P 21 121630 P 22 121642 P 22 123720 P 22
126085 P 22 127623 P 22 128320 P 23 126656 P 23
130653 P 23 118919 P 24 120104 P 24 121630 P 24
121634 P 24 121635 P 24 121738 P 25 122599 P 25
123867 P 25 124927 P 25 126416 P 26 127647 P 26

128334 P 26 128969 P 26 129239 P 27 122043 P 29
124318 P 28 120000 P 29 120378 P 29 120625 P 29
121646 P 29 121729 P 29 121754 P 30 122592 P 30
123913 P 30 124507 P 30 124763 P 31 125285 P 31
126529 P 31 127472 P 31 127604 P 32 127504 P 32
127586 P 32 127606 P 33 127920 P 33 128326 P 33
128659 P 34 129405 P 34 129931 P 36 130653 P 34
130891 P 35 130974 P 35 119193 P 36 121014 P 36
121729 P 36 126000 P 36 127818 P 37 130884 P 37
119248 P 38 120906 P 38 121108 P 38 121348 P 38
122839 P 38 124469 P 39 124989 P 39 125292 P 39
127698 P 40 116400 P 42 118532 P 42 121474 P 42
121754 P 42 122830 P 43 124369 P 43 124616 P 43
124983 P 43 126181 P 43 126673 P 44 127246 P 44
127247 P 44 127315 P 44 128323 P 44 129708 P 45
130987 P 45 119864 P 46 119866 P 46 119868 P 46
119876 P 46 119877 P 46 119899 P 47 120926 P 47
121271 P 47 121581 P 47 122105 P 48 124126 P 48
125973 P 48 126176 P 48 127811 P 49 129205 P 49
129737 P 49 129918 P 50 129944 P 50 129945 P 50
130876 P 50 124774 P 51 126679 P 51 131030 P 51
REACTOR, EWR
124481 P 9 120340 P 19 127504 P 32 126357 P 39
127498 P 40
REACTOR, MOLTEN SALT
124602 P 5
REACTOR, ORGANIC COOLED
127503 P 49
REACTOR, POWER
124481 P 3 124494 P 4 124530 P 6 126672 P 5
REACTOR, PWR
123859 P 20 130854 P 27
REACTOR, RESEARCH
126181 P 43
REACTOR, SAFETY RESEARCH
124107 P 17 121581 P 47
REACTOR, TEST
122010 P 11 127823 P 22 126416 P 26 127246 P 44
128383 P 44 130987 P 45 129737 P 49
REACTOR, THERMAL
124602 P 5 124774 P 51
REACTOR, THERMONUCLEAR
124776 P 51
RECOVERY PROCESS
129708 P 45
RELIABILITY ANALYSIS
122109 P 2 121327 P 10 122559 P 25 122043 P 29
124318 P 28 119858 P 46 119876 P 46 122105 P 48
RELIABILITY, COMPONENT
122959 P 25
RELIABILITY, SYSTEM
121327 P 10 122043 P 29 124318 P 28
RESOURCE, NATURAL
110534 P 1 129524 P 7
RESPONSE TIME
126628 P 29
RESPONSE TO NRC QUESTION
119864 P 46 119866 P 46 119868 P 46 119876 P 46
119877 P 46 119899 P 47 120928 P 47
RETENTION
124561 P 29
REVIEW
122109 P 2 124692 P 5 127504 P 32 127918 P 37
124369 P 43 127315 P 44 122108 P 48
SABOTAGE
119262 P 1 124320 P 3 126679 P 51
SAFEGUARDS, NUCLEAR MATERIAL
124320 P 3 124774 P 51 131030 P 51
SAFETY ANALYSIS
124601 P 4 126678 P 8 126176 P 17 130829 P 16
121738 P 25 124676 P 35 130854 P 37 124369 P 43
126181 P 43 128323 P 44 126176 P 48 126679 P 51
SAFETY EVALUATION
124987 P 30
SAFETY MARGIN
119876 P 46
SAFETY PRINCIPLES AND PHILOSOPHY
124320 P 3
SAFETY PROGRAM
120360 P 19
SAMPLING
129276 P 21 129277 P 21 121474 P 42
SCRUBBER
121014 P 19 121014 P 36
SEAL
121754 P 30 121754 P 42 129768 P 45
SEISMIC DESIGN
126678 P 8 127604 P 8
SEISMOLOGY
126678 P 8
SENSITIVITY ANALYSIS
121481 P 16
SHIELDING
127915 P 6
SHIPPING CONTAINER
124481 P 3 127612 P 9
SHOCK WAVE
120378 P 29
SHUTDOWN COOLING SYSTEM
121327 P 10 119865 P 48 130876 P 50
SHUTDOWN MECHANISM, SELF
126176 P 17 128334 P 26 128969 P 26 126176 P 48
SHUTDOWN SYSTEM, SECONDARY
128334 P 26 128969 P 26
SIMULATION
130987 P 45
SITING, OFF SHORE
127503 P 49
SITING, REACTOR
124774 P 51
SODIUM
123369 P 10 121735 P 10 124787 P 12 126894 P 12
129524 P 14 129906 P 14 130874 P 15 123197 P 16
125646 P 17 130829 P 18 119193 P 19 121014 P 19
127992 P 21 129277 P 21 121842 P 22 127823 P 22
126658 P 23 120154 P 24 121634 P 24 127647 P 26
121641 P 29 121729 P 29 124743 P 31 119193 P 36
121014 P 36 121729 P 36 130884 P 37 125292 P 39
116400 P 42 121474 P 42 124983 P 43 126181 P 43
129708 P 45 119899 P 47 121581 P 47 130876 P 50
SOLAR
122621 P 2
SOLVENT EXTRACTION PROCESS
122039 P 30
SPECTROMETRY, GAMMA
121735 P 10
SPRAY
124763 P 31
STACK
119387 P 41
STATEMENT, ENVIRONMENTAL
121273 P 47
STATISTICAL ANALYSIS
129502 P 14 123913 P 30
STEAM
123859 P 20
STEAM GENERATOR
120349 P 10 121635 P 22 121642 P 22 121638 P 24
121636 P 24 121635 P 24 121641 P 29 116400 P 42
126983 P 43 126181 P 43
STEEL
127484 P 32
STEEL, STAINLESS
118919 P 24 120000 P 29 123913 P 30 125285 P 31
127472 P 31 129405 P 34 130874 P 35
STRESS
122592 P 30 125292 P 39
STRESS ANALYSIS
130876 P 50
STRESS CORROSION
127504 P 32
STRESS RUPTURE
118919 P 24 127484 P 32
STRESS STRAIN DATA
130874 P 35
STRUCTURAL ANALYSIS, DYNAMIC
127804 P 8 127872 P 31 128690 P 34
STRUCTURAL INTEGRITY
127872 P 31
SUBCHANNEL ANALYSIS
122799 P 11 128656 P 13
SUPERPHENIX (LMFBR)
124494 P 4 126870 P 5 126878 P 6
SUPPORT STRUCTURE
127919 P 6
SURVEY
125632 P 17
SWELLING
127606 P 33 130874 P 35 129945 P 50
SYSTEM CAPABILITY
120928 P 47
SYSTEM DESCRIPTION
130874 P 15 128326 P 33 124676 P 35 120928 P 47
129944 P 50
TECHNICAL SPECIFICATIONS
125323 P 46
TECHNOLOGY
110891 P 35
TEMPERATURE
126606 P 13 130874 P 15 122592 P 30
TEMPERATURE GRADIENT
120341 P 10

TENSILE PROPERTY
120000 P 39
TEST, LEAK
121639 P 22
TEST, PROOF
123867 P 25
TESTING
119532 P 1 121639 P 22 127613 P 22 121639 P 24
123867 P 25 127647 P 26 127566 P 32 127832 P 33
124989 P 39 119832 P 42 119876 P 46 121591 P 47
THEFT/DIVERSION
119262 P 1 128413 P 6
THEORETICAL INVESTIGATION
122599 P 28
THERMAL ANALYSIS
122103 P 11 121642 P 22 121641 P 29 121729 P 29
121729 P 36 130054 P 37
THERMAL CONSIDERATION
123867 P 25
THERMAL EXPERIMENT
124787 P 12
THERMAL HYDRAULIC ANALYSIS
127684 P 13 128656 P 13 129504 P 14 130829 P 18
THERMAL MECHANICAL EFFECT
128000 P 13 128992 P 38
THERMAL PROPERTY
126529 P 31
THERMAL TRANSIENT
129901 P 15 130874 P 15 126529 P 31
THERMODYNAMICS
122103 P 11 128326 P 33 124943 P 43
THERMOPHORESIS
124277 P 21
THORIUM
124692 P 9 130851 P 35 126387 P 39 131030 P 51
TRAIN
124041 P 9
TRAINING
126453 P 6 130967 P 45
TRANSIENT
120341 P 10 128006 P 13 126176 P 17 130829 P 18
127992 P 21 126176 P 46
TRANSPORT
122179 P 16
TRANSPORT THEORY
126187 P 17
TRANSPORTATION AND HANDLING
124041 P 9 127612 P 9 121348 P 38 116400 P 42
TRANSURANIUM ELEMENT
120986 P 38
TREAT (PWR)
126529 P 31
TRITIUM
119193 P 19 119193 P 36 121474 P 42
TVA
121273 P 47
UHTREX (GCR)
120171 P 18
ULTRASONICS
121638 P 24
UNITED KINGDOM
123230 P 3 128672 P 5 128413 P 6 128622 P 6
124310 P 28 128000 P 33 124440 P 39 122830 P 43
124309 P 43
UNITED STATES
129239 P 27
URANIUM
118533 P 1 118534 P 1 129824 P 7 121738 P 18
121738 P 25 126357 P 39
URANIUM DIOXIDE
127992 P 21 128656 P 23 126829 P 31 127498 P 40
127511 P 49
USSR
124530 P 4
VAPOR EXCHANGE
130653 P 23 130653 P 34
VAPOR PRESSURE
121738 P 25
VENTILATION SYSTEM
119899 P 47
VIBRATION
127647 P 26
VOID
125644 P 17
VOID FRACTION
123197 P 18
WASTE DISPOSAL
119248 P 38 129918 P 50
WASTE HANDLING
119262 P 1
WASTE HEAT
126126 P 48
WASTE HEAT MANAGEMENT
124126 P 48
WASTE MANAGEMENT
121108 P 2 124320 P 3 128413 P 6 121108 P 38
124440 P 39
WASTE STORAGE
120928 P 47
WASTE TRANSPORTATION
121348 P 38
WASTE TREATMENT
120986 P 38 120928 P 47
WASTE TREATMENT, GAS
120928 P 47
WATER
120154 P 24
WATER VAPOR
123689 P 20
WEAR
124943 P 43
WELDING
120000 P 29 129295 P 31
WELDS
127472 P 31 124943 P 43
WESTINGHOUSE
127684 P 13 127583 P 32 127586 P 32 125973 P 48
WIND
130540 P 41
WIND PROFILE
130540 P 41
WIND TUNNEL EXPERIMENT
119387 P 41
ZIRCALOY
120340 P 19
ZIRCONIUM
120340 P 19 123864 P 20

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AUTHOR INDEX

FOLLOWING IS A LIST OF AUTHORS WHOSE DOCUMENTS
HAVE BEEN ABSTRACTED IN THIS PUBLICATION

ABRAHAMSON GR
127823 P 22
ABRAHAMSON S
124320 P 3
ABRAMSON PB
129901 P 15
AGGARWAL SK
127832 P 33
AITKEN A
124318 P 28
ALLARDICE RH
124449 P 39
ALLEN EJ
126357 P 39
ANDERSON TT
126416 P 26
ANDO Y
120378 P 29 128659 P 34
APOSTOLAKIS GE
122105 P 2 122105 P 48
ATCHESON DB
128006 P 13
BAKER L
120953 P 10
BALLIF JL
129708 P 45
BALLOFFET Y
124616 P 43
BARON IW
127583 P 32
BARTHOLD WP
126176 P 17 128959 P 26 126176 P 48
BARTINE DE
131630 P 51
BARTS EW
122810 P 11
BAYBUTT P
123859 P 20
BEGLEY JA
127586 P 32
BELL CR
122579 P 16
BERKEY E
121635 P 24
BESSE G
124494 P 4
BHARGAVA RK
129405 P 34
BLANCHARD P
124616 P 43
BLEIBERG ML
127583 P 32
BLEIWEIS PB
122579 P 16
BOASSO CJ
129518 P 14
BOBIS JP
126416 P 26
BODANSKY D
119262 P 1
BOGENSBERGER HG
121738 P 25
BOLT PR
127315 P 44
BOMAR ES
121348 P 38
BOND WD
121348 P 38
BOTTONI N
129504 P 14
BOUDREAU JE
122579 P 16
BOWERS CH
126176 P 17 126176 P 49
BRINKMAN CR
120000 P 29
BUCK C
124449 P 39
BUNDY M
124320 P 3
BURNS RS
124927 P 25
BUSCHMAN HB
121754 P 30 121754 P 42
BUTTEMER DW
124676 P 36
CAGLIOSTRO DJ
127823 P 22
CALRK AF
121754 P 30 121754 P 42
CANNON CP
123867 P 25
CARELLI MD
125258 P 12
CARTERET V
124616 P 43
CASTLE J
122103 P 11
CATOON I
122103 P 11
CATTON I
126085 P 22 130974 P 35 126085 P 36
CAVE L
122105 P 2 122105 P 48
CHA BK
129945 P 50
CHAN CK
123728 P 22 126085 P 22 126085 P 36
CHANG ALJ
127583 P 32
CHANG LK
128456 P 13
CHANG YW
127820 P 33
CHASANOV MG
120953 P 10
CHERMANNE J
124565 P 4
CHOPRA PS
126181 P 43
CISSEL DW
127246 P 44
CLAUZON PP
126673 P 18 126673 P 44
COFFIELD RD
127684 P 13
COHEN BL
123864 P 20
COMAR CL
123864 P 20
CONTE F
118532 P 1 116400 P 42 118532 P 42 127247 P 44
COOPER MH
124943 P 43
COTTRELL AM
123230 P 3
COULON P
126673 P 18 126673 P 44
CROUSE DJ
122839 P 38
CURTIS RT
124601 P 4
DE LORENZO JT
124927 P 25
DEBEAR WS
121639 P 22
DELPEYROUX P
124616 P 43
DENISE RP
124601 P 4 128320 P 23
DENNING RS
123859 P 20
DICKERMAN CE
129931 P 34
DIERCKS DR
123913 P 30
DONALDSON AM
124126 P 48
DUPREE SA
127612 P 9
DURAND RE
121639 P 22
ECKER JEB
122043 P 28
EDMONDS DP
125285 P 31
EGGEN DT
124969 P 26
ENGLISH JL
125292 P 39

EPLER EP
122105 P 2 122105 P 48
EPSTEIN LP
121635 P 24
ERDMAN CA
125644 P 17 130653 P 23 130653 P 34
FAUSKE HK
128656 P 23
FEE GG
120340 P 19
FIELDS SR
124041 P 9
FISCHER AK
122810 P 11
FISTEDIS SH
120625 P 29
FLORENCE AL
127823 P 22
FOUST OJ
120349 P 10
FRANGOS AZ
121581 P 47
FRANKE E
126713 P 18
FRIES W
129504 P 14
FRYER DRH
126672 P 5
FULFORD PJ
129945 P 50
FUNK CW
129708 P 45
GABOR JD
120963 P 10
GALE NL
128323 P 44
GANAPOL BD
126688 P 12
GARDNER PL
130653 P 23 130653 P 34
GASSER RD
124281 P 11
GAVIN AP
126416 P 26
GERPELS EE
121635 P 24
GIESEKE JA
123859 P 20 129277 P 21
GINSBERG T
122799 P 11
GLUECKLER EL
121729 P 29 121729 P 36
GODDET J
118532 P 1 118532 P 42 127247 P 44
GOODWIN GW
129286 P 31
GRAY DC
129276 P 21
GREENE DA
121630 P 24
GRIFFITHS RF
130540 P 41
GROSBERG AJ
122592 P 30
GRUNDY B
121635 P 24
GUILLAUME B
120966 P 38
HAN JT
124482 P 13
HANNAFORD J
126672 P 5
HASSBERGER JA
129518 P 14
HAYNS MR
125183 P 20
HIGGINS GT
126529 P 31
HILLIARD RK
121014 P 19 121014 P 36
HOLMES JT
121474 P 42
HOMAN PJ
126387 P 39
HORN HE
121735 P 10
HORNER DE
122839 P 38
HOWELLS G
123864 P 20
HUBEL D
124597 P 30
HUEBCTTER PR
129945 P 50
HUSAIN W
127832 P 33
HUTTER E
129239 P 27 126191 P 43
ILBERG D
122105 P 2 122105 P 48
IRVINE AR
124989 P 39
JOHNSON WB
125644 P 17
JONES FJ
124989 P 39
JONES RH
129205 P 49
JORDAN H
123859 P 20 129277 P 21
KAISER A
129506 P 14
KAPLAN G
128622 P 6
KAPLAN S
127696 P 33
KASTEN PR
126357 P 39
KASTENBERG WE
122105 P 2 126095 P 22 130974 P 35 126085 P 36
122105 P 48
KAWAGUCHI O
120378 P 29 128659 P 34
KAYSEN C
124320 P 3
KAZACHKOVSKI OD
124530 P 4
KAZIMI MS
124281 P 11 125239 P 12
KEENY SM
124320 P 3
KELBER CN
124601 P 4
KESSLER G
124597 P 30
KING RT
120000 P 29
KIRK WL
129171 P 16
KOJIMA T
129737 P 49
KOSLOV FA
121634 P 24
KRESS TS
127992 P 21
KRUGER GB
121641 P 29
KUCZERA B
129502 P 14
KUZNETSOV EK
121634 P 24
LANCET RT
121642 P 22
LAWSON RE
118387 P 41
LEAVELL WH
127835 P 19
LEE KW
129277 P 21
LEFEVRE JC
126678 P 8
LINZ DG
124787 P 12
LIVOLANT M
126678 P 8
LO RK
122810 P 11
LORENZ JJ
122799 P 11
LUCENET G
126678 P 8
LUCIUS JL
121481 P 16
LUDEWIG H
124107 P 17
MAFFEI HP
129708 P 45
MAGEE PW
121639 P 22
MAILEN JC

124541 P 20
MAJUMDAR D
125632 P 17
MARABLE JH
121481 P 16
MARCHATERRE JF
127818 P 37
MARQUETTE M
128334 P 26
MATHER DJ
123197 P 16
MATSUMURA M
120378 P 29
MAXWELL JA
127832 P 33
MCAFEE WJ
127472 P 31
MCCONNELL PM
125973 P 40
MCCORMACK JD
121014 P 19 121014 P 36
MCPHEETERS CC
119193 P 19 119193 P 36
MECHAM WJ
123864 P 20
MEGY J
127247 P 44
MEGY JM
118532 P 1 118532 P 42
MESHKOV AG
124530 P 4
MEYER RA
121639 P 22 121642 P 22
MILLBURG ML
129518 P 14
MILLS JC
121642 P 22
MIN TK
123728 P 22 126085 P 22 126085 P 36
MITENKOV FM
124530 P 4
MOFFITT WC
130967 P 45
MORGENSTERN FI
128326 P 33
MORSE LE
121348 P 38
MOTEFF J
129405 P 34
MUNNO FJ
129508 P 18
MURDOCK TB
121641 P 29
MYNATT FR
121481 P 16
NEMZEK TA
118533 P 1
NICHOLSON EL
127498 P 40
NOBLES RG
121754 P 30 121754 P 42
NOEL H
118532 P 1 118532 P 42
NOTZ KJ
126357 P 39
OBLOW EM
121481 P 16
OEYNHAUSEN H
128326 P 33
OKRENT D
123728 P 22 126085 P 22 130974 P 35 126085 P 36
OLDS FC
124369 P 43
OTT KO
120096 P 1
OYAMA A
124481 P 3
PAPP R
124597 P 30
PASCHALL RK
129334 P 26 119248 P 38
PEARLSTEIN L
123381 P 3
PEELLE RW
121481 P 16
PENET F
126673 P 18 126673 P 44
PEPPLER W
129506 P 14
PEREY FG
121481 P 16
PLANCHON HP
127684 P 13
POSTMA AK
121014 P 19 121014 P 36
POWERS PN
129975 P 51
PRISLINGER JJ
129205 P 49
PUNCHES JR
127686 P 33
PYUN JJ
125632 P 17
RASKE DT
123913 P 30
RAUE D
119193 P 19 119193 P 36
REDDY DP
127604 P 8
REED LD
129277 P 21
REYNOLDS AB
130653 P 23 130653 P 34
RICHARDSON M
127472 P 31
RICKARD CL
124676 P 36
RITCHIE LT
124148 P 41
ROBERTS JA
126529 P 31
RODWELL E
121641 P 29
ROTBLAT J
128413 P 6
ROY P
121635 P 24
ROYL P
129502 P 14
ROZENHOLE M
124494 P 4
RUGEL P
126453 P 5 122559 P 25
RUPPERT E
127647 P 26
RUSSO AJ
124148 P 41
SACKETT JI
128323 P 44
SAITEEVSKY B
124494 P 4
SANDUSKY DW
121630 P 24
SANE SJ
121642 P 22
SANE JD
121641 P 29
SARTORY WK
127472 P 31
SASAMUMA K
128659 P 34
SCHMIDT FM
119262 P 1
SCHMIDT TR
123318 P 16
SCHMIDT WM
127612 P 9
SCHOLLE U
128326 P 33
SCRIPSICK RC
129276 P 21
SEEFELDT WB
123864 P 20
SHAHROKHI F
127835 P 19
SHEAKS OJ
129508 P 18
SHEINKER AA
127586 P 32
SHEPPARD JD
127835 P 19
SHERRY RR
128006 P 13
SHIHE PR
126[illegible] P 12 124743 P 31
SIKKA VK
120000 P 29 129405 P 34
SIMMONS WR
121635 P 24
SIMON RH

124676 P 36
SLAUGHTER GM
125285 P 31
SMITH AM
127992 P 21
SMITH CRF
121474 P 42
SMITH RN
127246 P 44
SMITH RR
127246 P 44
SNYDER WH
118387 P 47
SOMERTON C
122103 P 11
SOWA ES
120963 P 10 128969 P 26
SPECHT ER
128334 P 26
SPEIS TP
124601 P 4 128320 P 23
SPIEWAK I
131030 P 51
STANNARD JN
123864 P 20
STARR C
126906 P 6
STEHLE H
127647 P 26
STEINDLER MJ
123064 P 20
STEPHENSON MJ
124541 P 20
STINS T
118919 P 24
STONE CC
126181 P 43
STRUWE D
129504 P 14
SUITA T
124481 P 3
SUN Y-H
130974 P 35
SWINDERMAN RW
129405 P 34
TAKEI A
120378 P 29
TATSUTOSHI I
129737 P 49
TENNERY VJ
121348 P 38
THEOFANOUS TG
128320 P 23
TILLERY MI
129276 P 21
TRAUBE K
126675 P 51
TUMA LA
129239 P 27
TZANOS CP
126176 P 17 126176 P 48
VALENTIN RA
121642 P 22
VALENTINE KH
124927 P 25
VAN TILBORG PJ
118919 P 24
VASILENKO KT
124530 P 4
VAUGHAN RD
124565 P 4
VENDRYES G
124494 P 4
VENDRYES GA
126870 P 5
VINKENS K
127647 P 26
WANTLAND JL
124787 P 12
WAYLAND JR
124148 P 41
WEBER DP
126688 P 12
WEINBERG AM
121153 P 2
WEISBIN CR
121481 P 16
WENT JJ
124692 P 5
WHITTINGHAM AC
120154 P 24
WILHELM D
120341 P 10
WILLIAMS J
124449 P 39
WILSON WK
127586 P 32
WOOD MH
125653 P 20
WRIGHT AL
127992 P 21
WRONA BJ
126529 P 31
WU R
122103 P 11
WYNN HC
127635 P 19
YARBRO OO
124541 P 20
YASINSKY JB
123704 P 3
YASUHITO O
129737 P 49
YEGOROV VA
121634 P 24
YOSHIZAWA H
128659 P 34

PERMUTED TITLE INDEX

THIS INDEX IS ONE IN WHICH THE REPORT TITLES ARE PERMUTED AROUND SIGNIFICANT WORDS WHICH APPEAR IN THE TITLE. THE INDEX WORDS ARE ARRANGED ALPHABETICALLY IN A COLUMN IN THE CENTER OF THE PAGE WITH THE TITLE PERMUTED AROUND THEM. (INDICATES BEGINNING OF TITLE. * INDICATES END OF TITLE.)

ACCIDENT* CONDENSATION OF FUEL ONTO THE
ACCIDENT* CONDENSATION OF FUEL ONTO THE
HYDRAULICALLY SUPPORTED
ENVIRONMENTAL TESTING OF CLASS 1E
SODIUM SPRAY RELEASE
LMFBR
ASSESSMENT OF
SPENT FUEL SHIPPING CASK
39, 1976* LMFBR FUEL ANALYSIS TASK B: POST-
SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER
SHIELD STRUCTURE IN THE LIQUID METAL FAST A STUDY OF POST-
THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE
THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE
A LOOK AT ALTERNATIVE CORE DISRUPTION
REVIEW OF THE TRANSITION PHASE OF CORE-DISRUPTIVE
A LOOK AT ALTERNATE CORE DISRUPTION
A LOOK AT ALTERNATE CORE DISRUPTION
FAILURE INCOHERENCE* ANALYSIS OF HYPOTHETICAL OVERPOWER
LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE
OVERVIEW OF CORE DISRUPTIVE
IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL CORE DISRUPTIVE
OF FAST BREEDER REACTORS TO HYPOTHETICAL CORE DISRUPTIVE
(PBF) EXPERIMENTS IN THE ANNULAR CORE PULSE REACTOR (
LMFBR SELF-
CONCEPTUAL DESIGN STUDIES OF AN
REPROCESSING, ENVIRONMENTAL ASSESSMENT OF LMFBR
1976 ASME - AMS INTERNATIONAL CONFERENCE ON
MARCH 1977* QUARTERLY PROGRESS REPORT ON THE
CHARACTERISTICS OF AGGLOMERATES OF SODIUM OXIDE
*
FUEL
CHARACTERISTICS OF
REACTORS* CHARACTERIZATION AND
PLANTS* EVALUATION OF
PLANTS* EVALUATION OF
CHARACTERIZATION AND AGING KINETICS STUDY OF GAMMA PRIME
A LOOK AT
A LOOK AT
A LOOK AT
COMPUTER CODES (IN GERMAN)* CONTRIBUTION TO TRANSIENT
SODIUM SPRAY RELEASE ACCIDENT
SEISMIC
SEISMIC SOIL/STRUCTURE INTERACTION
HEAT TRANSFER CORRELATION FOR
A COMPENDIUM OF COMPUTER CODES FOR THE SAFETY
ASSESSMENT OF LMFBR ADVANCED FUELS: A RADIOLOGICAL
300 MWH IA CORE WITH MODELING OF FAILURE INCOHERENCE*
STATES*
EXPERIMENTS* A PRELIMINARY
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE
JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL
REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL
REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL
SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, VOLUME I -
AND UNCERTAINTY METHODOLOGY TO FAST REACTOR BENCHMARK
EQUATION OF STATE OF OXIDE FUELS FOR FAST REACTOR SAFETY
EULERIAN, NECRITICALITY CODE FOR LMFBR DISRUPTED CORE
MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL
1976* FISSION PRODUCT TRANSPORT
A PRELIMINARY ANALYSIS OF THE
TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR
LMFBR PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN THE
SYSTEMS* 1976 ASME -
MATERIALS SCIENCE AND TECHNOLOGY -
NUCLEAR REACTOR SAFETY -
FLOWER POWER--WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN HELP
CLADDING MATERIAL*
STATES*
METHODOLOGY TO FAST REACTOR BENCHMARK ANALYSIS*

ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE 130653 P 23
ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE 130653 P 34
ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR'S* 128334 P 26
AC MOTOR CONTROL CENTER FOR NUCLEAR POWER PLANTS* 127832 P 33
ACCIDENT ANALYSIS FOR FAST REACTOR SAFETY STUDIES* 126664 P 12
ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING* 128320 P 23
ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE ACCIDENTS* 128656 P 23
ACCIDENT EVALUATION* 124041 P 9
ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 1975-SEPTEMBER 122103 P 11
ACCIDENT IN LMFBR'N* SOME ASPECTS OF 125644 P 17
ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL 124201 P 11
ACCIDENT* CONDENSATION OF FUEL ONTO 130653 P 23
ACCIDENT* CONDENSATION OF FUEL ONTO 130653 P 34
ACCIDENTS IN LMFBR'S* 123728 P 22
ACCIDENTS IN LMFBRS* 125632 P 17
ACCIDENTS IN LMFBRS* 126085 P 22
ACCIDENTS IN LMFBRS* 126085 P 36
ACCIDENTS IN THE SNR-300 MARK IA CORE WITH MODELING OF 129502 P 14
ACCIDENTS* 124601 P 4
ACCIDENTS* 128656 P 23
ACCIDENTS* 127818 P 37
ACCIDENTS* THE 129901 P 15
ACCIDENTS* STRUCTURAL RESPONSE 129625 P 23
ACPR)* LMFBR PROMPT BURST EXCURSION 123318 P 16
ACTIVATED SHUTDOWN SYSTEMS* 128969 P 26
ADVANCED CORE RESTRAINT SYSTEM* 129945 P 50
ADVANCED FUELS: A RADIOLOGICAL ANALYSIS OF FUEL 121348 P 38
ADVANCED NUCLEAR ENERGY SYSTEMS* 124774 P 51
ADVANCED TWO-PHASE INSTRUMENTATION PROGRAM FOR JANUARY- 127835 P 19
AEROSOL PARTICLES* 129277 P 21
AEROSOL SAMPLING AND CHARACTERIZATION FOR HAZARD EVALUATION 129276 P 21
AEROSOL SIMULANT TEST (FAST) PLAN* 127992 P 21
AGGLOMERATES OF SODIUM OXIDE AEROSOL PARTICLES* 129277 P 21
AGING KINETICS STUDY OF GAMMA PRIME ALLOYS FOR BREEDER 127583 P 32
AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR 121014 P 19
AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR 121014 P 36
ALLOYS FOR BREEDER REACTORS* 127583 P 32
ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 22
ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 36
ALTERNATIVE CORE DISRUPTION ACCIDENTS IN LMFBR'S* 123728 P 22
ANALYSIS OF GAS COOLED FAST BREEDER REACTORS WITH DIGITAL 120341 P 10
ANALYSIS FOR FAST REACTOR SAFETY STUDIES* 126664 P 13
ANALYSIS FOR THE SUPER-PHENIX REACTOR* 126676 P 8
ANALYSIS GUIDELINES, VOLUME I - ANALYSIS TECHNIQUES* 127604 P 8
ANALYSIS OF CRBRP ASSEMBLIES* 125256 P 12
ANALYSIS OF FAST BREEDER REACTORS* 130629 P 16
ANALYSIS OF FUEL REPROCESSING, REFABRICATION AND 121348 P 38
ANALYSIS OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SNR- 129502 P 14
ANALYSIS OF LARGE SODIUM-WATER REACTIONS IN THE UNITED 121642 P 22
ANALYSIS OF THE ANL PROPOSED SAFETY RELATED CRITICAL 124197 P 17
ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX* 126673 P 18
ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX* 126673 P 44
ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. FINAL REPORT 122103 P 11
ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL 122105 P 2
ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL 122105 P 48
ANALYSIS TECHNIQUES* SEISMIC 127604 P 8
ANALYSIS* APPLICATION OF FORSS SENSITIVITY 121401 P 16
ANALYSIS* VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND 121736 P 25
ANALYSIS* S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, 122579 P 16
ANALYSIS* DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, 123913 P 30
ANALYSIS, QUARTERLY PROGRESS REPORT JULY THROUGH SEPTEMBER 123859 P 20
ANL PROPOSED SAFETY RELATED CRITICAL EXPERIMENTS* 124107 P 17
ANNEALED 2.25 CR-1MO STEEL* A COMPARISON OF METHODS USED 127484 P 32
ANNULAR CORE PULSE REACTOR (ACPR)* 123318 P 16
ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR ENERGY 124774 P 51
ANS 1977 WINTER MEETING* 130851 P 36
ANS 1977 WINTER MEETING* 130854 P 37
ANYONE * 126881 P 7
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR 118919 P 34
APPLICATION OF CONTAINMENT CODES TO LMFBRS IN THE UNITED 127820 P 33
APPLICATION OF FORSS SENSITIVITY AND UNCERTAINTY 121401 P 16

SPECIFICATIONS FOR EBR-II: SOME CONSIDERATIONS FOR
LMFBR SPENT-FUEL CHARACTERIZATION FOR SHIPPING-CASK
WELDING DEVELOPMENT FOR LMFBR
RESPONSE TO QUESTION 011.14 - BOTTLING OF
ENERGY SYSTEMS* 1976
SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND
1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY
1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY
SAFETY
TRANSIENT OVERPOWER ACCIDENT IN LMFBR'S* SOME
STUDIES* BLOCKAGES IN LMFBR FUEL
THE RESPONSE OF VARIOUS WIRE-WRAP
HEAT TRANSFER CORRELATION FOR ANALYSIS OF CRBRP
IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR FUEL
CLINCH RIVER BREEDER REACTOR FUEL
COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL
SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL
RESPONSE TO QUESTION 001.427 - RELIABILITY
RISK-
OF ELECTRIC POWER*
ACCIDENTS*
ANALYSIS OF FUEL REPROCESSING, REFABRICATION ENVIRONMENTAL
QUARTER FISCAL 1977* THORIUM
OF RELEASE ON THE DISPERSION OF EFFLUENT RELEASED TO THE
OF POST-ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE

APPLICATION TO COMMERCIAL LMFBR'S*DEVELOPMENT OF TECHNICAL 128323 P 44
APPLICATION* 127612 P 9
APPLICATION* 125286 P 31
AR-39 AND AR-85 FROM CRYOGENIC STILL* 120928 P 47
ASME - ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR 124774 P 51
ASPECTS OF ITS FUEL CYCLE* 124597 P 30
ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 122105 P 2
ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 122105 P 48
ASPECTS OF NUCLEAR ENERGY* 119263 P 1
ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED 121644 P 17
ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND THEORETICAL 126452 P 13
ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION* 127686 P 33
ASSEMBLIES* 125258 P 12
ASSEMBLIES* TEMPERATURE DISTRIBUTION 124787 P 12
ASSEMBLY INLET/OUTLET NOZZLE FLOW TESTS* 125973 P 48
ASSEMBLY* 122792 P 11
ASSEMBLY* NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A 129518 P 14
ASSESSMENT FOR PIPE SLEEVES* 119868 P 46
ASSESSMENT METHODOLOGY FOR FAST BREEDER REACTORS* 120096 P 1
ASSESSMENT OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS 124318 P 28
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE 126656 P 23
ASSESSMENT OF LMFBR ADVANCED FUELS: A RADIOLOGICAL 121348 P 38
ASSESSMENT OF THE THORIUM FUEL CYCLE IN POWER REACTORS* 126357 P 39
ASSESSMENT STUDY QUARTERLY PROGRESS REPORT FOR THIRD 131030 P 51
ATMOSPHERE* EFFECT OF DURATION 130640 P 41
AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER 124281 P 11

SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK
LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR
CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3:
URANIUM INDUSTRY
HYDRAULICALLY SUPPORTED ABSORBER
BREEDER REACTOR CALLED
COST OF 20-YEAR DELAY COULD
PROGRAM* USERS MANUAL FOR THE
RESULTS OF SMALL LEAK
TRANSIENT CONDITIONS* MODELS OF FISSION GAS
DEVELOPMENTS* CREEP DEFORMATION AND RUPTURE
LMFBR FUEL PIN
FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE
FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE
CHARACTERISTICS AND
SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR
EXPERIMENTAL AND THEORETICAL STUDIES*
AND TWO PHASE PRESSURE DROP* SODIUM
THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN IN-PILE
RESPONSE TO QUESTION 011.14 -
NUCLEAR REACTORS - TO
NUCLEAR REACTORS - TO BREED OR NOT TO
PROSPECTS AND IMPACTS OF
COMMUNICATIONS SYSTEMS CLINCH RIVER
SAFETY OF THE LIQUID METAL COOLED FAST
I - EXECUTIVE SUMMARY* LIQUID METAL FAST
PROGRAMME AND CURRENT STATUS OF FAST
TESTS* CLINCH RIVER
CLINCH RIVER
HEAT REJECTION FOR THE CLINCH RIVER
STATUS AND PROSPECTS OF THE FRENCH FAST
USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST
TRADEOFF STUDIES. PART 1: SODIUM PROTOTYPE LARGE
TRADEOFF STUDIES. PART 3: BALANCE OF PLANT PROTOTYPE LARGE
SUPERPHENIX: A FULL SCALE
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST
UNITED KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST
THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST
LIQUID METAL FAST
STUDIES, DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST
STRUCTURAL RESPONSE OF FAST
CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED FAST
RISK-ASSESSMENT METHODOLOGY FOR FAST
THE NEED FOR HIGH PERFORMANCE
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST
OF COMPUTER CODES FOR THE SAFETY ANALYSIS OF FAST
AND AGING KINETICS STUDY OF GAMMA PRIME ALLOYS FOR
EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX
CALCULATION OF FAST
THE
RELATED TO CONSTRUCTION AND OPERATION OF CLINCH RIVER
FISSION,
STATUS AND PROSPECTS OF THERMAL
FLOWER POWER--WILL A NUCLEAR POWER SLOWDOWN IN
A STUDY OF THE REACTIVITY EFFECT OF

8: POST-ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 1976- 122103 P 11
BALANCE OF PLANT DESIGN CHARACTERISTICS* ERDA-EPRI 129916 P 50
BALANCE OF PLANT ENGINEERING SUPPORT STUDIES* PHASE II: 130676 P 50
BALKS AT KICK FROM CARTER* 129524 P 7
BALLS SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR'S* 128334 P 26
BARGAIN'* 122625 P 2
BE $3.5 TRILLION* 126907 P 6
BEHAVE-SST (STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS 120006 P 13
BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE U.S.* 121630 P 24
BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY STATE AND 125653 P 20
BEHAVIOR IN TYPE 304/308 STAINLESS STEEL STRUCTURAL 127472 P 31
BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE FRUMP* 122592 P 30
BEHAVIOUR OF PHENIX* SAFETY CONCLUSIONS 126673 P 18
BEHAVIOUR OF PHENIX* SAFETY CONCLUSIONS 126673 P 44
BEHAVIOUR OF THE PHENIX FUEL ELEMENT* 124616 P 43
BENCHMARK ANALYSIS* APPLICATION OF FORSS 121481 P 16
BLOCKAGES IN LMFBR FUEL ASSEMBLIES - A REVIEW OF 126452 P 13
BOILING EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW PATTERNS 129506 P 14
BOILING EXPERIMENTS* 129504 P 14
BOTTLING OF AR-39 AND AR-85 FROM CRYOGENIC STILL* 120928 P 47
BREED OR NOT TO BREED* 128413 P 6
BREED* 128413 P 6
BREEDER COMMERCIALIZATION* 116533 P 1
BREEDER PLANT SYSTEM DESIGN DESCRIPTION* 129944 P 50
BREEDER REACTOR AND ASPECTS OF ITS FUEL CYCLE* 124597 P 30
BREEDER REACTOR CALLED 'BARGAIN'* 122625 P 2
BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 127511 P 49
BREEDER REACTOR DEVELOPMENT IN JAPAN* 134481 P 3
BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE FLOW 125973 P 48
BREEDER REACTOR PLANT TECHNICAL REVIEW, SUMMER 1977* 127515 P 6
BREEDER REACTOR PLANT* 124126 P 46
BREEDER REACTOR PROGRAMME* 124494 P 4
BREEDER REACTOR SPENT FUEL ELEMENTS--A LITERATURE SURVEY* 125292 P 39
BREEDER REACTOR, PHASE II: CONCEPTUAL DESIGN. VOLUME III: 130874 P 15
BREEDER REACTOR, PHASE II: CONCEPTUAL DESIGN. VOLUME III: 130876 P 50
BREEDER REACTOR* 126870 P 5
BREEDER REACTOR* 129239 P 27
BREEDER REACTOR* 122830 P 43
BREEDER REACTOR* ACCIDENT MOLTEN FUEL DOWNWARD STREAMING 124281 P 11
BREEDER REACTOR: DECISION PROCESS AND ISSUES* 118534 P 1
BREEDER REACTORS IN JAPAN* 129737 P 49
BREEDER REACTORS TO HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 126625 P 29
BREEDER REACTORS WITH DIGITAL COMPUTER CODES (IN GERMAN)* 120341 P 10
BREEDER REACTORS* 120096 P 1
BREEDER REACTORS* 124565 P 4
BREEDER REACTORS* 124927 P 25
BREEDER REACTORS* A COMPENDIUM 130829 P 18
BREEDER REACTORS* CHARACTERIZATION 127583 P 32
BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD* 128622 P 6
BREEDER SPECTRA* 126713 P 18
BREEDER STORY* 123704 P 3
BREEDER* FINAL ENVIRONMENTAL STATEMENT 121273 P 47
BREEDER, REPROCESSING AND 'HAVE-NOTS'--ROSE OF MIT* 122621 P 2
BREEDERS* 124692 P 5
BRITAIN HELP ANYONE * 128681 P 7
BRITAIN'S PROTOTYPE FAST REACTOR* 124369 P 43
BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS* 129808 P 16

DETERMINATION OF A NECESSARY HEIGHT FOR A STACK CLOSE TO A
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO
SODIUM BOILING EXPERIMENTS IN A SEVEN-PIN
PULSE REACTOR (ACPR)* LMFBR PROMPT
APPARATUS FOR THERMAL TRANSIENT TUBE
PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE
ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL.

1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK
1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL
MULTI-FIELD HYDRODYNAMIC DISASSEMBLY
BREEDER REACTOR
URANIUM INDUSTRY BALKS AT KICK FROM
ENERGY POLICY AND ENERGY PROJECTIONS: THE
SPENT FUEL SHIPPING
LMFBR SPENT-FUEL CHARACTERIZATION FOR SHIPPING-
ENVIRONMENTAL TESTING OF CLASS 1E AC MOTOR CONTROL
DESIGN-RELATED INHERENT SAFETY
DESIGN-RELATED INHERENT SAFETY
PARTICLES*
PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF PLANT DESIGN
ALLOYS FOR BREEDER REACTORS*
AEROSOL SAMPLING AND
LMFBR SPENT-FUEL
NUCLEAR POWER ISSUES AND
RESPONSE TO QUESTION 001.406 - NATURAL
SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL NATURAL
LMFBR NATURAL
A SIMPLIFIED METHOD OF COMPUTING
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR
ENVIRONMENTAL TESTING OF
TO QUESTION 001.398 - RELEASE OF FISSION PRODUCTS DURING
EVALUATION OF AIR
EVALUATION OF AIR
COMMUNICATIONS SYSTEMS
NOZZLE FLOW TESTS*
SUMMER 1977*
HEAT REJECTION FOR THE
STATEMENT RELATED TO CONSTRUCTION AND OPERATION OF
DETERMINATION OF A NECESSARY HEIGHT FOR A STACK
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED
MULTIFIELD, MULTICOMPONENT, EULERIAN, NONTRITICALITY
FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE
SPRAY
OF GAS COOLED FAST BREEDER REACTORS WITH DIGITAL COMPUTER
A COMPENDIUM OF COMPUTER
APPLICATION OF CONTAINMENT
CONTROL OF TRITIUM IN LMFBR SODIUM BY
CONTROL OF TRITIUM IN LMFBR SODIUM BY
A STUDY OF THE REACTIVITY EFFECT OF BUBBLE
STUDIES, DESIGN, AND DEVELOPMENT OF
SAFETY ISSUES IN LICENSING
FOR EBR-II: SOME CONSIDERATIONS FOR APPLICATION TO
UNITED KINGDOM NEARS DECISION ON
PROSPECTS AND IMPACTS OF BREEDER
DESIGN DESCRIPTION*
RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO STEEL* A
FAST BREEDER REACTORS* A
CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A
RESPONSE TO QUESTION 222.47 - SHUTDOWN SYSTEM
UNDER SODIUM RELIABILITY TESTS ON CORE
FOR IN-SERVICE INSPECTION AND MONITORING OF SELECTED
- RELEASE OF FISSION PRODUCTS DURING CLEANING OF LARGE
ANALYSES OF GAS COOLED FAST BREEDER REACTORS WITH DIGITAL
REACTORS* A COMPENDIUM OF
IRRADIATION* A SIMPLIFIED METHOD OF
EX-VESSEL CORE RETENTION
EX-VESSEL CORE RETENTION
EVALUATION OF AIR CLEANING SYSTEM
EVALUATION OF AIR CLEANING SYSTEM
POWER PLANT*
SYSTEM*
SODIUM PROTOTYPE LARGE BREEDER REACTOR. PHASE II:
BALANCE OF PROTOTYPE LARGE BREEDER REACTOR. PHASE II:
SUMMARY* LIQUID METAL FAST BREEDER REACTOR
THE CORE BEHAVIOUR OF PHENIX* SAFETY
THE CORE BEHAVIOUR OF PHENIX* SAFETY
AN LMFBR CORE-DISRUPTIVE ACCIDENT*
AN LMFBR CORE-DISRUPTIVE ACCIDENT*
IN FAST REACTOR FUELS UNDER STEADY STATE AND TRANSIENT

BUILDING--A WIND TUNNEL STUDY* 116387 P 41
BUNDLE-TO-DUCT INTERACTION* 127686 P 33
BUNDLE: FLOW PATTERNS AND TWO PHASE PRESSURE DROP* 129506 P 14
BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR CORE 123316 P 16
BURST TESTS ON LMFBR CLADDING MATERIAL* 118919 P 24
BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH 126622 P 6
B2 PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS* 129918 P 50

C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 122105 P 2
C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 122105 P 48
CABLES* 123067 P 25
CALCULATION OF FAST BREEDER SPECTRA* 126713 P 10
CALCULATIONS WITH SPACE-TIME KINETICS: FX2/VENUS-III* 126686 P 12
CALLED 'BARGAIN'* 122625 P 2
CARTER* 129624 P 7
CASE OF A NUCLEAR MORATORIUM* 121153 P 3
CASK ACCIDENT EVALUATION* 124041 P 9
CASK APPLICATION* 127612 P 9
CENTER FOR NUCLEAR POWER PLANTS* 127032 P 33
CHARACTERISTICS AND BEHAVIOUR OF THE PHENIX FUEL ELEMENT* 124616 P 43
CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 17
CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 48
CHARACTERISTICS OF AGGLOMERATES OF SODIUM OXIDE AEROSOL 129277 P 21
CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN PROJECTS 129918 P 50
CHARACTERIZATION AND AGING KINETICS STUDY OF GAMMA PRIME 127563 P 33
CHARACTERIZATION FOR HAZARD EVALUATION* 129276 P 21
CHARACTERIZATION FOR SHIPPING-CASK APPLICATION* 127612 P 9
CHOICES* 124328 P 3
CIRCULATION DECAY HEAT REMOVAL* 11[illegible]066 P 46
CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED FULL- 129616 P 14
CIRCULATION VERIFICATION PROGRAM (MCVP)* 127684 P 13
CLAD AND FUEL STRAIN AND STRESS DURING IRRADIATION* 130974 P 35
CLADDING MATERIAL* 118919 P 24
CLASS 1E AC MOTOR CONTROL CENTER FOR NUCLEAR POWER PLANTS* 127032 P 33
CLEANING OF LARGE COMPONENTS* RESPONSE 119664 P 46
CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 19
CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 36
CLINCH RIVER BREEDER PLANT SYSTEM DESCRIPTION* 129944 P 50
CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET 125973 P 48
CLINCH RIVER BREEDER REACTOR PLANT TECHNICAL REVIEW, 127515 P 6
CLINCH RIVER BREEDER REACTOR PLANT* 124126 P 48
CLINCH RIVER BREEDER* FINAL ENVIRONMENTAL 121273 P 47
CLOSE TO A BUILDING--A WIND TUNNEL STUDY* 116387 P 41
COATED FUEL PARTICLES - FABRICATION* 126088 P 33
COAXIAL CABLES* 123067 P 25
CODE FOR LMFBR DISRUPTED CORE ANALYSIS*S(SUB N), IMPLICIT, 122579 P 16
CODE FRUMP* LMFBR 122592 P 38
CODE USER'S REPORT* 124743 P 31
CODES (IN GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES 120341 P 10
CODES FOR THE SAFETY ANALYSIS OF FAST BREEDER REACTORS* 130829 P 18
CODES TO LMFBRS IN THE UNITED STATES* 127828 P 33
COLD TRAPPING* 119193 P 19
COLD TRAPPING* 119193 P 36
COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS* 129508 P 18
COMMERCIAL FAST BREEDER REACTORS IN JAPAN* 129737 P 49
COMMERCIAL LMFBR'S* 126672 P 5
COMMERCIAL LMFBR'S*DEVELOPMENT OF TECHNICAL SPECIFICATIONS 126323 P 44
COMMERCIAL-SIZE FAST BREEDER REACTOR* 122830 P 43
COMMERCIALIZATION* 118533 P 1
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM 129944 P 50
COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS 127484 P 32
COMPENDIUM OF COMPUTER CODES FOR THE SAFETY ANALYSIS OF 130829 P 18
COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND 123913 P 30
COMPONENT FAILURE* 119677 P 46
COMPONENTS AND IN-CORE INSTRUMENTATION* 127647 P 26
COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY 127315 P 44
COMPONENTS* RESPONSE TO QUESTION 001.398 119664 P 46
COMPUTER CODES (IN GERMAN)* CONTRIBUTION TO TRANSIENT 120341 P 10
COMPUTER CODES FOR THE SAFETY ANALYSIS OF FAST BREEDER 130829 P 18
COMPUTING CLAD AND FUEL STRAIN AND STRESS DURING 130974 P 35
CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 30
CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 36
CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 19
CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 36
CONCEPTUAL DESIGN DESCRIPTION, 3000-MWE SUBSEA NUCLEAR 127503 P 49
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED CORE RESTRAINT 129945 P 50
CONCEPTUAL DESIGN, VOLUME III: TRADEOFF STUDIES. PART 1: 130874 P 15
CONCEPTUAL DESIGN, VOLUME III: TRADEOFF STUDIES. PART 3: 130876 P 50
CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE 127511 P 49
CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF 126673 P 10
CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF 126673 P 44
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING 130663 P 23
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING 130663 P 34
CONDITIONS* MODELS OF FISSION GAS BEHAVIOR 125683 P 20

STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM CYCLE	CONDITIONS* II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF	130874	P 15
1976 ASME - ANS INTERNATIONAL	CONFERENCE ON ADVANCED NUCLEAR ENERGY SYSTEMS*	124774	P 51
PROCEEDINGS OF THE INTERNATIONAL	CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION*	124943	P 43
INFLUENCE OF PLUME RISE ON THE	CONSEQUENCES OF RADIOACTIVE MATERIAL RELEASES*	124146	P 41
DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR EBR-II: SOME	CONSIDERATIONS FOR APPLICATION TO COMMERCIAL LMFBR'S*	128323	P 44
OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--	CONSIDERATIONS FOR USE OF WATER COOLANT FOR DECAY STORAGE	125292	P 39
PHENIX	CONSTRUCTION AND OPERATING EXPERIENCE*	116532	P 1
PHENIX	CONSTRUCTION AND OPERATING EXPERIENCE*	116532	P 42
FINAL ENVIRONMENTAL STATEMENT RELATED TO	CONSTRUCTION AND OPERATION OF CLINCH RIVER BREEDER*	121273	P 47
APPLICATION OF	CONTAINMENT CODES TO LMFBRS IN THE UNITED STATES*	127620	P 33
SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY	CONTAINMENT OF SODIUM COOLED FAST REACTORS* MONITORING OF	127315	P 44
DESIGN REQUIREMENTS FOR THE SNR-300	CONTAINMENT SYSTEM*	125326	P 34
BREEDER REACTORS WITH DIGITAL COMPUTER CODES (IN GERMAN)*	CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED FAST	120341	P 15
ENVIRONMENTAL TESTING OF CLASS 1E AC MOTOR	CONTROL CENTER FOR NUCLEAR POWER PLANTS*	127032	P 33
	CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING*	119193	P 19
	CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING*	119193	P 36
RESPONSE TO QUESTION 310.32 - SODIUM FIRE EFFECT ON	CONTROL ROOM HABITABILITY*	119899	P 47
COMPILATION, MULTIPLE LINEAR ELEVATED-TEMPERATURE, STRAIN-	CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A	123913	P 38
REACTOR SPENT FUEL CONSIDERATIONS FOR USE OF WATER	COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER	125292	P 39
ASSEMBLY*	COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL	122799	P 11
SAFETY OF THE LIQUID METAL	COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL CYCLE*	124597	P 38
TUBULAR GAGE FOR A LIQUID-METAL-	COOLED FAST BREEDER REACTOR*	129630	P 27
(IN GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES OF GAS	COOLED FAST BREEDER REACTORS WITH DIGITAL COMPUTER CODES (	120341	P 18
GAS-	COOLED FAST REACTOR SAFETY*	124676	P 38
ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM	COOLED FAST REACTORS*	123197	P 16
LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF SODIUM	COOLED FAST REACTORS*AND MONITORING OF SELECTED COMPONENTS	127315	P 44
REACTIVITY EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL	COOLED REACTORS* A STUDY OF THE	129008	P 18
EULERIAN, RECRITICALITY CODE FOR LMFBR DISRUPTED	CORE ANALYSIS* N), IMPLICIT, MULTIFIELD, MULTICOMPONENT,	122679	P 16
FROM START-UP TESTS AND FROM THE ANALYSIS OF THE	CORE BEHAVIOUR OF PHENIX* SAFETY CONCLUSIONS	128673	P 18
FROM START-UP TESTS AND FROM THE ANALYSIS OF THE	CORE BEHAVIOUR OF PHENIX* SAFETY CONCLUSIONS	128673	P 44
UNDER SODIUM RELIABILITY TESTS ON	CORE COMPONENTS AND IN-CORE INSTRUMENTATION*	127647	P 38
A LOOK AT ALTERNATIVE	CORE DISRUPTION ACCIDENTS IN LMFBR'S*	123728	P 35
A LOOK AT ALTERNATE	CORE DISRUPTION ACCIDENTS IN LMFBRS*	126066	P 23
A LOOK AT ALTERNATE	CORE DISRUPTION ACCIDENTS IN LMFBRS*	126066	P 36
THE IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL	CORE DISRUPTIVE ACCIDENTS*	129901	P 15
OVERVIEW OF	CORE DISRUPTIVE ACCIDENTS*	127818	P 37
RESPONSE OF FAST BREEDER REACTORS TO HYPOTHETICAL	CORE DISRUPTIVE ACCIDENTS* STRUCTURAL	126625	P 29
UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-	CORE INSTRUMENTATION*	127647	P 38
PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR	CORE PULSE REACTOR (ACPR)* LMFBR	123318	P 16
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED	CORE RESTRAINT SYSTEM*	129945	P 50
EX-VESSEL	CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS*	121729	P 30
EX-VESSEL	CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS*	121729	P 36
CONDENSATION OF FUEL ONTO THE ABOVE-	CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT*	130653	P 23
CONDENSATION OF FUEL ONTO THE ABOVE-	CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT*	130653	P 34
OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SNR-300 MARK IA	CORE WITH MODELING OF FAILURE INCOHERENCE* ANALYSIS	129502	P 14
IRRADIATION OF MICROPHONES IN THE EBR-II	CORE*	126416	P 26
OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR	CORE-DISRUPTIVE ACCIDENT* CONDENSATION	130653	P [illegible]
OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR	CORE-DISRUPTIVE ACCIDENT* CONDENSATION	130653	P [illegible]
REVIEW OF THE TRANSITION PHASE OF	CORE-DISRUPTIVE ACCIDENTS IN LMFBRS*	125632	P 17
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR	CORE-DISRUPTIVE ACCIDENTS*	128656	P 23
HEAT TRANSFER	CORRELATION FOR ANALYSIS OF CRBRP ASSEMBLIES*	125256	P 12
PHOEBUS/UHTREX: A PRELIMINARY STUDY OF A LOW-	COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL*	126171	P 18
	COST OF 20-YEAR DELAY COULD BE 63.6 TRILLION*	126907	P 6
COST OF 20-YEAR DELAY	COULD BE $3.5 TRILLION*	126907	P 6
REPORTED STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25	CR-1MO STEEL* A COMPARISON OF METHODS USED TO DETERMINE	127404	P 32
FINAL REPORT*	CRACK PROPAGATION TESTING FOR LMFBR PIPING - PHASE II	127066	P 32
HEAT TRANSFER CORRELATION FOR ANALYSIS OF	CRBRP ASSEMBLIES*	125256	P 12
HUMAN FACTORS IN	CRBRP DESIGN AND PLANNING FOR SAFETY*	126453	P 5
HUMAN FACTORS IN	CRBRP DESIGN AND PLANNING FOR SAFETY*	128559	P 25
DESIGN OF THE US-	CRBRP SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM*	121641	P 29
9T2796)* SUBSTRUCTURES DEVELOPED DURING	CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (HEAT	129485	P 34
STAINLESS STEEL STRUCTURAL WELDMENTS*	CREEP DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/308	127472	P 31
DECONTAMINATION AND DECOMMISSIONING	CRITERIA FOR USE IN DESIGN OF NEW PLUTONIUM FACILITIES*	119248	P 38
A PRELIMINARY ANALYSIS OF THE ANL PROPOSED SAFETY RELATED	CRITICAL EXPERIMENTS*	124107	P 17
TO QUESTION 311.14 - BOTTLING OF AR-39 AND KR-85 FROM	CRYOGENIC STILL* RESPONSE	120928	P 47
THE USSR FAST REACTOR DEVELOPMENT PROGRAM AND ITS	CURRENT STATE*	124530	P 4
* PROGRAMME AND	CURRENT STATUS OF FAST BREEDER REACTOR DEVELOPMENT IN JAPAN	124481	P 3
III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM	CYCLE CONDITIONS* PHASE II: CONCEPTUAL DESIGN. VOLUME	130874	P 15
ASSESSMENT OF THE THORIUM FUEL	CYCLE IN POWER REACTORS*	126357	P 30
LMFBR - FUEL	CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO*	121108	P 2
LMFBR - FUEL	CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO*	121108	P 38
METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL	CYCLE* SAFETY OF THE LIQUID	124597	P 38
SUBSTRUCTURES DEVELOPED DURING CREEP AND	CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (HEAT 9T2796)*	129485	P 34
RESULTS OF SMALL LEAK BEHAVIOR AND	DAMAGE PROPAGATION TESTS IN THE U.S.*	121630	P 34
LOSS OF FLOW* SUMMARY AND EVALUATION OF TRANSIENT TEST	DATA ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED	129931	P 34
LINEAR ELEVATED-TEMPERATURE, STRAIN-CONTROLLED FATIGUE	DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE	123913	P 38
RESPONSE TO QUESTION 001.406 - NATURAL CIRCULATION	DECAY HEAT REMOVAL*	119066	P 46
FUEL ELEMENTS-- CONSIDERATIONS FOR USE OF WATER COOLANT FOR	DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT	125292	P 39
UNITED KINGDOM NEARS	DECISION ON COMMERCIAL-SIZE FAST BREEDER REACTOR*	122630	P 43
LIQUID METAL FAST BREEDER REACTOR:	DECISION PROCESS AND ISSUES*	116534	P 1
LICENSING	DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS*	124601	P 4
PLUTONIUM FACILITIES* DECONTAMINATION AND	DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF NEW	119248	P 38
DESIGN OF NEW PLUTONIUM FACILITIES*	DECONTAMINATION AND DECOMMISSIONING CRITERIA FOR USE IN	119248	P 38

STEEL STRUCTURAL WELDMENTS* CREEP
COST OF 20-YEAR
SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM DESIGN
CONCEPTUAL DESIGN
HUMAN FACTORS IN CRBRP
HUMAN FACTORS IN CRBRP
PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF PLANT
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM
CONCEPTUAL
DECONTAMINATION AND DECOMMISSIONING CRITERIA FOR USE IN
SAFETY
RELIEF SYSTEM*
3F PLANT DESIGN CHARACTERISTICS* ERDA-EPRI LMFBR
CONCEPTUAL
PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL
PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL
LMFBR POWER PLANTS*
LMFBR POWER PLANTS*
REACTORS IN JAPAN* STUDIES,
LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL PLANT
HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK
HYDROGEN
HYDROGEN AND OXYGEN LEAK
BUILDING--A WIND TUNNEL STUDY*
ANNEALED 2.25 CR-1MO STEEL* A COMPARISON OF METHODS USED TO
STAINLESS STEEL (HEAT 972796)* SUBSTRUCTURES
SUMMARY - WEEKS FOR ENERGY-RELATED MATERIALS RESEARCH AND
HYDROGEN AND OXYGEN LEAK DETECTOR SYSTEM
TRANSIENT ANALYSES OF GAS COOLED FAST BREEDER REACTORS WITH
THE NUCLEAR POWER
FX2/VENUS-III* MULTI-FIELD HYDRODYNAMIC
* SODIUM REMOVAL,
EFFECT OF DURATION OF RELEASE ON THE
MULTICOMPONENT, EULERIAN, RECRITICALITY CODE FOR LMFBR
A LOOK AT ALTERNATIVE CORE
A LOOK AT ALTERNATE CORE
A LOOK AT ALTERNATE CORE
3F FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-
OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-
REVIEW OF THE TRANSITION PHASE OF CORE-
THE IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL CORE
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-
OVERVIEW OF CORE
RESPONSE OF FAST BREEDER REACTORS TO HYPOTHETICAL CORE
FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THE PUO2
FUEL ASSEMBLIES* TEMPERATURE
HEAT TRANSFER* THE PREDICTION OF TEMPERATURE
MEASUREMENT OF THE ENERGY
THE LIQUID METAL FAST A STUDY OF POST-ACCIDENT MOLTEN FUEL
IN A SEVEN-PIN BUNDLE* FLOW PATTERNS AND TWO PHASE PRESSURE
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-
TEMPERATURE DISTRIBUTION IN THE
TO THE ATMOSPHERE* EFFECT OF
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE
CONDENSATION OF FUEL ONTO THE ABOVE-CORE STRUCTURE
RESPONSE TO QUESTION 981.390 - RELEASE OF FISSION PRODUCTS
HEAT 972796)* SUBSTRUCTURES DEVELOPED
METHOD OF COMPUTING CLAD AND FUEL STRAIN AND STRESS
EXPERIMENTAL STUDY ON
FUEL

EX-VESSEL CORE RETENTION CONCEPT FOR
EX-VESSEL CORE RETENTION CONCEPT FOR
STRUCTURAL SHOCK TESTS OF PROTOTYPE
IRRADIATION OF MICROPHONES IN THE
OPERATING EXPERIENCE WITH THE
OPERATING EXPERIENCE WITH THE
PURITY OF
FAIL-SAFETY OF THE
LMFBR'S* DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR
REACTORS* A STUDY OF THE REACTIVITY
EFFLUENT RELEASED TO THE ATMOSPHERE*
RESPONSE TO QUESTION 310.32 - SODIUM FIRE
U.S. PROGRAM FOR TESTING LARGE SODIUM-WATER REACTION
EFFECT OF DURATION OF RELEASE ON THE DISPERSION OF
OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF
FPTT
TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-PIN
CHARACTERISTICS AND BEHAVIOUR OF THE PHENIX FUEL
PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC
STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL
TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR

DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/304 STAINLESS 127474 P 31
DELAY COULD BE $3.5 TRILLION* 136907 P 6
DESCRIPTION* COMMUNICATIONS 129944 P 50
DESCRIPTION, 3000-MWE SUBSEA NUCLEAR POWER PLANT* 127503 P 49
DESIGN AND PLANNING FOR SAFETY* 126453 P 5
DESIGN AND PLANNING FOR SAFETY* 122559 P 25
DESIGN CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN PROJECTS 129918 P 50
DESIGN DESCRIPTION* 129944 P 50
DESIGN DESCRIPTION, 3000-MWE SUBSEA NUCLEAR POWER PLANT* 127503 P 49
DESIGN OF NEW PLUTONIUM FACILITIES* 119248 P 36
DESIGN OF SNR-300* 126675 P 51
DESIGN OF THE US-CRBRP SODIUM-WATER REACTION PRESSURE 121641 P 29
DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR BALANCE 129918 P 50
DESIGN REQUIREMENTS FOR THE SNR-300 CONTAINMENT SYSTEM* 126326 P 34
DESIGN STUDIES OF AN ADVANCED CORE RESTRAINT SYSTEM* 129945 P 50
DESIGN, VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM 130874 P 15
DESIGN, VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF 130876 P 50
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE 126176 P 17
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE 126176 P 48
DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST BREEDER 129737 P 49
DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY* 127511 P 49
DETECTION IN LMFBR SYSTEMS* STUDY OF THE LIQUID SODIUM- 120154 P 24
DETECTOR IN SODIUM* 121634 P 24
DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.* 121635 P 24
DETERMINATION OF A NECESSARY HEIGHT FOR A STACK CLOSE TO A 118387 P 41
DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR 127484 P 32
DEVELOPED DURING CREEP AND CYCLIC TESTS OF TYPE 304 129405 P 34
DEVELOPMENT, VOLUME 1 - NEAR-TERM ENERGY PROGRAM*EXECUTIVE 127504 P 32
DEVELOPMENTS IN THE U.S.* 121635 P 24
DIGITAL COMPUTER CODES (IN GERMAN)* CONTRIBUTION TO 130341 P 18
DILERNA* 129975 P 51
DISASSEMBLY CALCULATIONS WITH SPACE-TIME KINETICS: 126688 P 12
DISASSEMBLY, AND EXAMINATION OF FERMI SECONDARY SODIUM PUMP 129708 P 45
DISPERSION OF EFFLUENT RELEASED TO THE ATMOSPHERE* 130540 P 41
DISRUPTED CORE ANALYSIS*AN S(SUB N), IMPLICIT, MULTIFIELD, 122579 P 16
DISRUPTION ACCIDENTS IN LMFBR'S* 123728 P 22
DISRUPTION ACCIDENTS IN LMFBRS* 126086 P 22
DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 36
DISRUPTIVE ACCIDENT* CONDENSATION 130653 P 23
DISRUPTIVE ACCIDENT* CONDENSATION 130653 P 34
DISRUPTIVE ACCIDENTS IN LMFBRS* 125632 P 17
DISRUPTIVE ACCIDENTS* 129901 P 15
DISRUPTIVE ACCIDENTS* 126656 P 23
DISRUPTIVE ACCIDENTS* 127816 P 37
DISRUPTIVE ACCIDENTS* STRUCTURAL 129625 P 29
DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR 127498 P 49
DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR 124787 P 12
DISTRIBUTION OF A SUBASSEMBLY INCLUDING INTERSUBASSEMBLY 126456 P 13
DISTRIBUTION OF THE GAMMA FIELD IN A FAST REACTOR* 121735 P 10
DOWNWARD STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN 124281 P 11
DROP* SODIUM BOILING EXPERIMENTS 129606 P 14
DUCT INTERACTION* 127666 P 33
DUCT WALL OF 19-PIN SIMULATED LMFBR FUEL ASSEMBLIES* 124787 P 12
DURATION OF RELEASE ON THE DISPERSION OF EFFLUENT RELEASED 130540 P 41
DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* 130653 P 23
DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* 130653 P 34
DURING CLEANING OF LARGE COMPONENTS* 119864 P 46
DURING CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (129405 P 34
DURING IRRADIATION* A SIMPLIFIED 130274 P 35
DYNAMIC RESPONSE OF REACTOR VESSEL TO AN HCDA* 126659 P 34
DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11

EARLY SIZED LMFBRS* 121729 P 30
EARLY SIZED LMFBRS* 121729 P 36
EBR 'MONJU' SCALE MODELS* 120378 P 29
EBR-II CORE* 126416 P 26
EBR-II OPERATING EXPERIENCE* 127246 P 44
EBR-II ROTATING-PLUG FREEZE SEALS - 1969-1975* 121754 P 30
EBR-II ROTATING-PLUG FREEZE SEALS - 1969-1975* 121754 P 42
EBR-II SODIUM: 1967-1974* 121474 P 42
EBR-II STEAM GENERATOR* 126161 P 43
EBR-II: SOME CONSIDERATIONS FOR APPLICATION TO COMMERCIAL 128323 P 44
EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED 129508 P 18
EFFECT OF DURATION OF RELEASE ON THE DISPERSION OF 130540 P 41
EFFECT ON CONTROL ROOM HABITABILITY* 119899 P 47
EFFECTS* 121639 P 22
EFFLUENT RELEASED TO THE ATMOSPHERE* 130540 P 41
ELECTRIC POWER* ASSESSMENT 124318 P 28
ELECTRICAL SYSTEM RELIABILITY STUDY* 122043 P 28
ELECTRICALLY HEATED FUEL ASSEMBLY*NATURAL CIRCULATION HEAT 129518 P 14
ELEMENT* 124616 P 43
ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)* 120966 P 38
ELEMENTS--A LITERATURE SURVEY* OF WATER COOLANT FOR DECAY 126292 P 39
ELEVATED-TEMPERATURE, STRAIN-CONTROLLED FATIGUE DATA ON 123913 P 30

EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 19
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 36
LMFBR ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING* 120320 P 23
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE ACCIDENTS* 120656 P 23
MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE GAMMA FIELD IN A FAST REACTOR* 121735 P 10
NUCLEAR MORATORIUM* ENERGY POLICY AND ENERGY PROJECTIONS: THE CASE OF A 121153 P 2
THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION* PROCEEDINGS OF 124943 P 43
MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR-TERM ENERGY PROGRAM* SUMMARY - NEEDS FOR ENERGY-RELATED 127504 P 32
FAST REACTORS* ENERGY POLICY AND ENERGY PROJECTIONS: THE CASE OF A NUCLEAR MORATORIUM* 121153 P 2
ASME - ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED 123197 P 18
SAFETY ASPECTS OF NUCLEAR ENERGY SYSTEMS* 1976 124774 P 81
1 - NEAR-TERM ENERGY PROGRAM* EXECUTIVE SUMMARY - NEEDS FOR ENERGY* 119262 P 1
RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, REFABRICATION ENERGY-RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 127504 P 32
OPERATION OF CLINCH RIVER BREEDER* FINAL ENVIRONMENTAL ASSESSMENT OF LMFBR ADVANCED FUELS: A 121348 P 38
FOR NUCLEAR POWER PLANTS* ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION AND 121273 P 47
PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS* ERDA- ENVIRONMENTAL TESTING OF CLASS 1E AC MOTOR CONTROL CENTER 127032 P 33
ANALYSIS* VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2 129910 P 50
HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER AN EQUATION OF STATE OF OXIDE FUELS FOR FAST REACTOR SAFETY 121738 P 20
02 PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS* EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM- 129184 P 24
RESPONSE TO QUESTION 222.40 - INCORPORATION OF A MARGIN OF ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. 129918 P 50
I: AN S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, ERROR IN PREDICTIONS* 119076 P 46
BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD* EULERIAN, NECRITICALITY CODE FOR LMFBR DISRUPTED CORE 122579 P 16
USE IN LMFBR PLANTS* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX 120522 P 6
USE IN LMFBR PLANTS* EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY 121014 P 19
RESULTING FROM UNPROTECTED LOSS OF FLOW* SUMMARY AND EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY 121014 P 36
SPENT FUEL SHIPPING CASK ACCIDENT EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL MOTION 129931 P 34
AEROSOL SAMPLING AND CHARACTERIZATION FOR HAZARD EVALUATION* 124041 P 9
EVALUATION* 129276 P 21
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 38
SODIUM REMOVAL, DISASSEMBLY, AND EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 38
FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXAMINATION OF FERMI SECONDARY SODIUM PUMP* 129700 P 48
· VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* 129205 P 49
REACTOR (ACPR)* LMFBR PROMPT BURST EXCHANGERS, AND STEAM GENERATORS* MAX ENGINEERING HANDBOOK 120349 P 10
RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR-TERM ENERGY EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR CORE PULSE 123310 P 10
REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY - NEEDS FOR ENERGY-RELATED MATERIALS 127504 P 32
1989-1975* OPERATING EXECUTIVE SUMMARY* LIQUID METAL FAST BREEDER 127511 P 49
1989-1975* OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE SEALS - 121754 P 38
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE SEALS - 121754 P 48
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE* 118532 P 1
EBR-II OPERATING EXPERIENCE* 118532 P 42
BLOCKAGES IN LMFBR FUEL ASSEMBLIES - A REVIEW OF EXPERIENCE* 127248 P 44
TO AN HCDA* EXPERIMENTAL AND THEORETICAL STUDIES* 120452 P 13
PHASE PRESSURE DROP* SODIUM BOILING EXPERIMENTAL STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL 120659 P 34
LMFBR PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO 129806 P 14
INTERPRETATION OF SCARABEE SINGLE PIN IN-PILE BOILING EXPERIMENTS IN THE ANNULAR CORE PULSE REACTOR (ACPR)* 123310 P 10
ANALYSIS OF THE ANL PROPOSED SAFETY RELATED CRITICAL EXPERIMENTS* THEORETICAL 129504 P 14
FLOW* SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXPERIMENTS* A PRELIMINARY 124107 P 17
NUCLEAR POWER AND THE PUBLIC INTEREST (EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF 129931 P 34
LABORATORY DEVELOPMENT OF SOLVENT EXTRACTED)* 123230 P 3
EXTRACTION PROCESS FOR SPENT LMFBR FUELS* 128859 P 38

PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR RESOLUTION* 127496 P 40
EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER HEAT 129205 P 49
COATED FUEL PARTICLES - FABRICATION* 126000 P 33
DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF NEW PLUTONIUM FACILITIES* DECONTAMINATION AND 119148 P 36
PHOEBUS/UHTREX: A PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL* 120171 P 16
SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-SCALE FACILITY* LMFBR 124989 P 39
HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* FABRICATION OF AN IMPROVED TUBE-TO-PIPE 129205 P 49
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY* 126453 P 5
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY* 122559 P 28
PLUTONIUM: FACTS AND INFERENCES* 123864 P 28
FAIL-SAFETY OF THE EBR-II STEAM GENERATOR* 126101 P 43
ACCIDENTS IN THE BWR-300 MARK IA CORE WITH MODELING OF FAILURE INCOHERENCE* ANALYSIS OF HYPOTHETICAL OVERPOWER 129502 P 14
AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* FABRICATION OF 129205 P 49
RESPONSE TO QUESTION 222.47 - SHUTDOWN SYSTEM COMPONENT FAILURE* 119877 P 46
SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL CYCLE* 124597 P 38
VOLUME 1 - EXECUTIVE SUMMARY* LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. 127511 P 49
PROGRAMME AND CURRENT STATUS OF FAST BREEDER REACTOR DEVELOPMENT IN JAPAN* 124481 P 3
STATUS AND PROSPECTS OF THE FRENCH FAST BREEDER REACTOR PROGRAMME* 124494 P 4
FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A LITERATURE 125292 P 30
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR* 129239 P 27
UNITED KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST BREEDER REACTOR* 122630 P 43
THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR* MOLTEN FUEL DOWNWARD STREAMING 124281 P 11
LIQUID METAL FAST BREEDER REACTOR: DECISION PROCESS AND ISSUES* 118534 P 1
STUDIES, DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST BREEDER REACTORS IN JAPAN* 129737 P 49
ACCIDENTS* STRUCTURAL RESPONSE OF FAST BREEDER REACTORS TO HYPOTHETICAL CORE DISRUPTIVE 128625 P 29
GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED FAST BREEDER REACTORS WITH DIGITAL COMPUTER CODES (IN 120341 P 10
RISK-ASSESSMENT METHODOLOGY FOR FAST BREEDER REACTORS* 120096 P 1
A COMPENDIUM OF COMPUTER CODES FOR THE SAFETY ANALYSIS OF FAST BREEDER REACTORS* 130829 P 18
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS* 124927 P 25
CALCULATION OF FAST BREEDER SPECTRA* 126713 P 18
OF FGHDS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR BENCHMARK ANALYSIS* APPLICATION 121481 P 16
THE USSR FAST REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT STATE* 124530 P 4
FAST REACTOR FUEL REPROCESSING IN THE US* 124449 P 39

CONDITIONS* MODELS OF FISSION GAS BEHAVIOR IN
TO 7000 K AND EQUATION OF STATE OF OXIDE FUELS FOR
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR
GAS-COOLED
BRITAIN'S PROTOTYPE
OF THE ENERGY DISTRIBUTION OF THE GAMMA FIELD IN A
ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED
WITHIN OR PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED
FUEL AEROSOL SIMULANT TEST (
MULTIPLE LINEAR ELEVATED-TEMPERATURE, STRAIN-CONTROLLED
SODIUM REMOVAL, DISASSEMBLY, AND EXAMINATION OF
TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (

PROGRAM*
TIME KINETICS: FX2/VENUS-III* MULTI-
MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE GAMMA
OPERATION OF CLINCH RIVER BREEDER*
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS.
LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL.
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS.
CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II
CRACK PROPAGATION TESTING FOR LMFBR PIPING - PHASE II
FFTF HTS/DHX PROTOTYPE MODULE TESTING IN SCTI
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (
RESPONSE TO QUESTION 310.32 - SODIUM
STUDY QUARTERLY PROGRESS REPORT FOR THIRD QUARTER
STATE AND TRANSIENT CONDITIONS* MODELS OF
REPORT JULY THROUGH SEPTEMBER 1976*
RESPONSE TO QUESTION 901.398 - RELEASE OF
*
SODIUM BOILING EXPERIMENTS IN A SEVEN-PIN BUNDLE:
FUEL DYNAMICS LOSS-OF-
RIVER BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE
ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF
STEAM SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM
HELP ANYONE *
REACTOR BENCHMARK ANALYSIS* APPLICATION OF
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG
STATUS AND PROSPECTS OF THE
THE BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE
ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (IN
PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE

REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR
REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR
REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR
STUDIES* BLOCKAGES IN LMFBR
DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR
CLINCH RIVER BREEDER REACTOR
COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR
A SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED
LMFBR SPENT-
ASSESSMENT OF THE THORIUM
LMFBR -
LMFBR -
LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS
IN THE LIQUID METAL FAST A STUDY OF POST-ACCIDENT MOLTEN

CHARACTERISTICS AND BEHAVIOUR OF THE PHENIX
DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT
OF AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE
SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED
DISRUPTIVE ACCIDENT* CONDENSATION OF
DISRUPTIVE ACCIDENT* CONDENSATION OF
COATED
CODE FRUMP* LMFBR
FAST REACTOR
RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR
OF LMFBR ADVANCED FUELS: A RADIOLOGICAL ANALYSIS OF
LMFBR SPENT
MANUAL FOR THE BEHAVE-SST (STEADY STATE AND TRANSIENT)
SPENT
A SIMPLIFIED METHOD OF COMPUTING CLAD AND
STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR
MEASUREMENTS TO 7000 K AND EQUATION OF STATE OF OXIDE
MODELS OF FISSION GAS BEHAVIOR IN FAST REACTOR
DEVELOPMENT OF SOLVENT EXTRACTION PROCESS FOR SPENT LMFBR
REFABRICATION ENVIRONMENTAL ASSESSMENT OF LMFBR ADVANCED
DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR
SUPERPHENIX: A
NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED
TOMORROW, FUSION SEEMS THE BY[illegible]* EUROPE: TILTING TOWARD
- TODAY THE FRENCH PHENIX [illegible]EEDER SCORES WELL; TOMORROW,
DISASSEMBLY CALCULA[illegible]S WITH SPACE-TIME KINETICS:

FAST REACTOR FUELS UNDER STEADY STATE AND TRANSIENT 125653 P 20
FAST REACTOR SAFETY ANALYSIS* VAPOUR PRESSURE MEASUREMENTS 121736 P 25
FAST REACTOR SAFETY STUDIES* 126004 P 12
FAST REACTOR SAFETY* 124676 P 30
FAST REACTOR* 124369 P 43
FAST REACTOR* MEASUREMENT 121736 P 10
FAST REACTORS* 123197 P 10
FAST REACTORS* MONITORING OF SELECTED COMPONENTS LOCATED 127315 P 44
FAST) PLAN* 127992 P 21
FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, 123913 P 33
FERMI SECONDARY SODIUM PUMP* 129706 P 45
FFM) FACILITY* FABRICATION OF AN IMPROVED TUBE- 129205 P 49
FFTF ELECTRICAL SYSTEM RELIABILITY STUDY* 122043 P 28
FFTF HTS/DHX PROTOTYPE MODULE TESTING IN SCTI FINAL REPORT* 121581 P 47
FFTF OPERATIONS: INITIAL OPERATOR TRAINING SIMULATOR 130967 P 45
FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH SPACE- 126608 P 12
FIELD IN A FAST REACTOR* 121735 P 10
FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION AND 121273 P 47
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122105 P 2
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122103 P 11
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122105 P 46
FINAL REPORT VOL. 52 PLBR BALANCE OF PLANT DESIGN 129918 P 50
FINAL REPORT* 127506 P 32
FINAL REPORT* 121581 P 47
FINAL REPORT)* 122810 P 11
FIRE EFFECT ON CONTROL ROOM HABITABILITY* 119899 P 47
FISCAL 1977* THORIUM ASSESSMENT 131030 P 51
FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY 125653 P 20
FISSION PRODUCT TRANSPORT ANALYSIS, QUARTERLY PROGRESS 123659 P 20
FISSION PRODUCTS DURING CLEANING OF LARGE COMPONENTS* 129364 P 46
FISSION, BREEDER, REPROCESSING AND 'HAVE-NOTS'--ROSE OF MIT 122621 P 2
FLOW PATTERNS AND TWO PHASE PRESSURE DROP* 129506 P 14
FLOW TEST L3 (FINAL REPORT)* 122810 P 11
FLOW TESTS* CLINCH 125973 P 48
FLOW* SUMMARY AND EVALUATION OF TRANSIENT TEST DATA 129931 P 34
FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND 120349 P 10
FLOWER POWER--WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN 128881 P 7
FORSS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST 121401 P 16
FREEZE SEALS - 1969-1976* 121754 P 30
FREEZE SEALS - 1969-1975* 121754 P 42
FRENCH FAST BREEDER REACTOR PROGRAMME* 124494 P 4
FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS 128622 P 6
FRENCH)* PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC 120966 P 38
FRUMP* LMFBR FUEL 122592 P 38
FUEL AEROSOL SIMULANT TEST (FAST) PLAN* 127992 P 21
FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. FINAL 122103 P 11
FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL 122105 P 2
FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL 122105 P 46
FUEL ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND THEORETICAL 128452 P 13
FUEL ASSEMBLIES* TEMPERATURE 124707 P 12
FUEL ASSEMBLY INLET/OUTLET NOZZLE FLOW TESTS* 125973 P 48
FUEL ASSEMBLY* 122799 P 11
FUEL ASSEMBLY* CIRCULATION HEAT TRANSFER TESTING WITH 120514 P 14
FUEL CHARACTERIZATION FOR SHIPPING-CASK APPLICATION* 127612 P 9
FUEL CYCLE IN POWER REACTORS* 128357 P 39
FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 2
FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 38
FUEL CYCLE* SAFETY OF THE 124597 P 28
FUEL DOWNWARD STREAMING THROUGH THE AXIAL SHIELD STRUCTURE 124281 P 11
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11
FUEL ELEMENT* 124616 P 43
FUEL ELEMENTS--A LITERATURE SURVEY* OF WATER COOLANT FOR 125292 P 39
FUEL FAILURE MOCKUP (FFM) FACILITY* FABRICATION 129205 P 49
FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW* 129931 P 34
FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE- 130653 P 23
FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE- 130653 P 34
FUEL PARTICLES - FABRICATION* 128000 P 33
FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE 122592 P 30
FUEL REPROCESSING IN THE UK* 124449 P 39
FUEL REPROCESSING WASTES (IN FRENCH)* PROBLEMS 120966 P 38
FUEL REPROCESSING, REFABRICATION AND TRANSPORTATION* 121348 P 38
FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-SCALE FACILITY* 124989 P 39
FUEL ROD MECHANICS PROGRAM* USERS 126006 P 13
FUEL SHIPPING CASK ACCIDENT EVALUATION* 124041 P 9
FUEL STRAIN AND STRESS DURING IRRADIATION* 130974 P 36
FUEL* PHOEBUS/UHTREX: A PRELIMINARY 120171 P 16
FUELS FOR FAST REACTOR SAFETY ANALYSIS* VAPOUR PRESSURE 121736 P 25
FUELS UNDER STEADY STATE AND TRANSIENT CONDITIONS* 125653 P 20
FUELS* LABORATORY 122839 P 38
FUELS: A RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, 121348 P 38
FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR 127494 P 49
FULL SCALE BREEDER REACTOR* 126670 P 5
FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL ASSEMBLY* 129518 P 14
FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES WELL; 128622 P 6
FUSION SEEMS THE BYWORD* EUROPE: TILTING TOWARD FUSION 128622 P 6
FX2/VENUS-III* MULTI-FIELD HYDRODYNAMIC 126608 P 12

TUBULAR
MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE
CHARACTERIZATION AND AGING KINETICS STUDY OF
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--
TRANSIENT CONDITIONS* MODELS OF FISSION
CODES (IN GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES OF
RETENTION OF
FAIL-SAFETY OF THE EBR-II STEAM
HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM
FAST BREEDER REACTORS WITH DIGITAL COMPUTER CODES (IN
SEISMIC SOIL/STRUCTURE INTERACTION ANALYSIS

TO QUESTION 310.32 - SODIUM FIRE EFFECT ON CONTROL ROOM
INTERMEDIATE HEAT EXCHANGERS, AND SODIUM-NAK ENGINEERING
FISSION, BREEDER, REPROCESSING AND *
AEROSOL SAMPLING AND CHARACTERIZATION FOR
STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL TO AN
FACILITY* FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER
FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER
- VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE
POSTACCIDENT
LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT
RELIABILITY PROGRAM FOR SHUTDOWN
RESPONSE TO QUESTION 501.400 - NATURAL CIRCULATION DECAY
THE IMPORTANCE OF
217-PIN ELECTRICALLY HEATED FUEL NATURAL CIRCULATION
DISTRIBUTION OF A SUBASSEMBLY INCLUDING INTERSUBASSEMBLY
SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW,
DURING CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (
WITH A SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY
MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT
* DETERMINATION OF A NECESSARY
FLOWER POWER--WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN
THE NEED FOR
* ASSESSMENT OF A
PROGRAMS AT OAK RIDGE NATIONAL DECEMBER 1976 MONTHLY
FFTF

INHERENTLY SAFE LMFBR'S*
KINETICS: FX2/VENUS-III* MULTI-FIELD
THE U.S.*

AN EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM-
THE IMPORTANCE OF HEAT TRANSFER IN
STRUCTURAL RESPONSE OF FAST BREEDER REACTORS TO
ZONE WITH MODELING OF FAILURE INCOHERENCE* ANALYSIS OF

EULERIAN, RECRITICALITY CODE FOR LMFBR DISRUPTED SI-MER-
OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SNR-300 MARK
I: SODIUM PROTOTYPE LARGE BREEDER REACTOR. PHASE
3: BALANCE OF PLANT PROTOTYPE LARGE BREEDER REACTOR. PHASE
LMFBR'S* DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR EBR-
LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME
LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME
PROSPECTS AND
RECRITICALITY CODE FOR LMFBR SIMMER-I: AN S(SUB N),
DISRUPTIVE ACCIDENTS* THE
FAILURE MOCKUP (FFM) FACILITY* FABRICATION OF AN
UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND
THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN
COMPONENTS LOCATED WITHIN OR PART OF THE PROPOSALS FOR
THE PREDICTION OF TEMPERATURE DISTRIBUTION OF A SUBASSEMBLY
IN THE SNR-300 MARK IA CORE WITH MODELING OF FAILURE
RESPONSE TO QUESTION 222.40 -
LMFBR SPENT FUEL REPROCESSING: A STUDY OF AN
URANIUM
PLUTONIUM: FACTS AND
MATERIAL RELEASES*
* DESIGN-RELATED
* DESIGN-RELATED
HYDRAULICALLY SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR
FFTF OPERATIONS:
CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLY
WITHIN OR PART OF THE PRIMARY PROPOSALS FOR IN-SERVICE
QUARTERLY PROGRESS REPORT ON THE ADVANCED TWO-PHASE
SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-CORE

GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR* 139239 P 27
GAMMA FIELD IN A FAST REACTOR* 131736 P 18
GAMMA PRIME ALLOYS FOR BREEDER REACTORS* 137503 P 32
GAO* 131108 P 2
GAO* 131108 P 30
GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY STATE AND 139653 P 20
GAS COOLED FAST BREEDER REACTORS WITH DIGITAL COMPUTER 130361 P 19
GAS-COOLED FAST REACTOR SAFETY* 124676 P 36
GASEOUS ISOTOPES* 124641 P 26
GENERATOR* 126101 P 45
GENERATORS*ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, 130349 P 18
GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED 130341 P 18
GUIDELINES, VOLUME I - ANALYSIS TECHNIQUES* 137804 P 6

HABITABILITY* RESPONSE 119899 P 47
HANDBOOK - VOLUME II - SODIUM FLOW, HEAT TRANSFER, 130349 P 18
HAVE-NOTS*--ROSE OF MIT* 122621 P 2
HAZARD EVALUATION* 120276 P 21
HCDA* EXPERIMENTAL 120659 P 34
HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) 129206 P 49
HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* 129206 P 49
HEAT EXCHANGERS, AND STEAM GENERATORS*ENGINEERING HANDBOOK 130349 P 18
HEAT REJECTION FOR THE CLINCH RIVER BREEDER REACTOR PLANT* 124126 P 46
HEAT REMOVAL TECHNOLOGY* 120963 P 10
HEAT REMOVAL. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122103 P 11
HEAT REMOVAL* 121327 P 19
HEAT REMOVAL* 119866 P 46
HEAT TRANSFER CORRELATION FOR ANALYSIS OF CRBRP ASSEMBLIES* 126256 P 12
HEAT TRANSFER IN HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 129901 P 15
HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 129516 P 14
HEAT TRANSFER* THE PREDICTION OF TEMPERATURE 126456 P 13
HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM 130349 P 18
HEAT STRESS)* SUBSTRUCTURES DEVELOPED 129405 P 34
HEATED FUEL ASSEMBLY* CIRCULATION HEAT TRANSFER TESTING 129516 P 14
HEATING* 126529 P 31
HEIGHT FOR A STACK CLOSE TO A BUILDING--A WIND TUNNEL STUDY 116307 P 41
HELP ANYONE * 128801 P 7
HIGH PERFORMANCE BREEDER REACTORS* 124566 P 4
HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER 124318 P 38
HIGHLIGHTS FOR OFFICE OF NUCLEAR REGULATORY RESEARCH 130340 P 19
HTS/DHX PROTOTYPE MODULE TESTING IN SGTI FINAL REPORT* 121561 P 47
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY* 126453 P 5
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR SAFETY* 123500 P 23
HYDRAULICALLY SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR 126374 P 28
HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH SPACE-TIME 126600 P 13
HYDROGEN AND OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN 121636 P 24
HYDROGEN DETECTOR IN SODIUM* 121624 P 24
HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK 120154 P 24
HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 129901 P 15
HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 126625 P 29
HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SNR-300 MARK IA 129502 P 14

I: AN S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, 122579 P 16
IA CORE WITH MODELING OF FAILURE INCOHERENCE* ANALYSIS 129502 P 14
II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 130874 P 15
II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 130876 P 50
II: SOME CONSIDERATIONS FOR APPLICATION TO COMMERCIAL 128323 P 44
III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND 130874 P 15
III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT 130876 P 50
IMPACTS OF BREEDER COMMERCIALIZATION* 116533 P 1
IMPLICIT, MULTIFIELD, MULTICOMPONENT, EULERIAN, 122579 P 16
IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL CORE 129901 P 15
IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL 129206 P 49
IN-CORE INSTRUMENTATION* 127647 P 26
IN-PILE BOILING EXPERIMENTS* 129504 P 14
IN-SERVICE INSPECTION AND MONITORING OF SELECTED 127315 P 44
INCLUDING INTERSUBASSEMBLY HEAT TRANSFER* 126456 P 13
INCOHERENCE* ANALYSIS OF HYPOTHETICAL OVERPOWER ACCIDENTS 129502 P 14
INCORPORATION OF A MARGIN OF ERROR IN PREDICTIONS* 119876 P 46
INDUSTRIAL-SCALE FACILITY* 124969 P 30
INDUSTRY BALKS AT KICK FROM CARTER* 129524 P 7
INFERENCES* 123664 P 20
INFLUENCE OF PLUME RISE ON THE CONSEQUENCES OF RADIOACTIVE 124148 P 41
INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS 126176 P 17
INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS 126176 P 48
INHERENTLY SAFE LMFBR'S* 128334 P 26
INITIAL OPERATOR TRAINING SIMULATOR PROGRAM* 130967 P 45
INLET/OUTLET NOZZLE FLOW TESTS* 125973 P 40
INSPECTION AND MONITORING OF SELECTED COMPONENTS LOCATED 127315 P 44
INSTRUMENTATION PROGRAM FOR JANUARY-MARCH 1977* 127635 P 19
INSTRUMENTATION* UNDER 127647 P 26

TEMPERATURE AND VOLTAGE TESTS ON M03 INSULATED COAXIAL CABLES* 123867 P 25
ASSESSMENT OF A HIGH- INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER* 124316 P 28
TECHNIQUES* SEISMIC SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, VOLUME 1 - ANALYSIS 127684 P 8
RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION* THE 127686 P 33
NUCLEAR POWER AND THE PUBLIC INTEREST (EXTRACTED)* 123230 P 3
HANDBOOK - VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM GENERATORS* 120349 P 10
1976 ASME - ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR ENERGY SYSTEMS 124774 P 51
ENERGY PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN 124943 P 43
EXPERIMENTS* THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN IN-PILE BOILING 129564 P 14
OF TEMPERATURE DISTRIBUTION OF A SUBASSEMBLY INCLUDING INTERSUBASSEMBLY HEAT TRANSFER* THE PREDICTION 126456 P 15
IRRADIATION OF MICROPHONES IN THE EBR-II CORE* 126416 P 26
METHOD OF COMPUTING CLAD AND FUEL STRAIN AND STRESS DURING IRRADIATION* A SIMPLIFIED 130974 P 35
RETENTION OF GASEOUS ISOTOPES* 124541 P 29
NUCLEAR POWER ISSUES AND CHOICES* 124320 P 3
SAFETY ISSUES IN LICENSING COMMERCIAL LMFBR'S* 126472 P 8
LIQUID METAL FAST BREEDER REACTOR: DECISION PROCESS AND ISSUES* 118034 P 1
THE JSBR FAST REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT STATE* 124538 P 4
THE LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL CYCLE* SAFETY OF 124897 P 30
KINETIC STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR 120154 P 24

ON THE ADVANCED TWO-PHASE INSTRUMENTATION PROGRAM FOR JANUARY-MARCH 1977* QUARTERLY PROGRESS REPORT 127839 P 19
AND CURRENT STATUS OF FAST BREEDER REACTOR DEVELOPMENT IN JAPAN* PROGRAMME 124401 P 3
AND DEVELOPMENT OF COMMERCIAL FAST BREEDER REACTORS IN JAPAN* STUDIES, DESIGN, 129737 P 49

URANIUM INDUSTRY BALKS AT RICK FROM CARTER* 139024 P 7
ITS RELEVANCE TO SODIUM-WATER LEAK AN EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND 120154 P 24
CHARACTERIZATION AND AGING KINETICS STUDY OF GAMMA PRIME ALLOYS FOR BREEDER REACTORS* 127583 P 32
FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH SPACE-TIME KINETICS: FX2/VENUS-III* MULTI- 136688 P 12
REACTOR* UNITED KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST BREEDER 122039 P 43
RESPONSE TO QUESTION 011.14 - BOTTLING OF AR-39 AND GR-85 FROM CRYOGENIC STILL* 126926 P 47
CONCEPTUAL DESIGN DESCRIPTION, 3000- RWE SUBSEA NUCLEAR POWER PLANT* 127503 P 48

SPENT LMFBR FUELS* LABORATORY DEVELOPMENT OF SOLVENT EXTRACTION PROCESS FOR 132839 P 38
NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE NATIONAL LABORATORY* DECEMBER 1976 MONTHLY HIGHLIGHTS FOR OFFICE OF 126340 P 19
III: TRADEOFF STUDIES. PART 1: SODIUM PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME 130074 P 18
III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME 130076 P 50
001.300 - RELEASE OF FISSION PRODUCTS DURING CLEANING OF LARGE COMPONENTS* RESPONSE TO QUESTION 119064 P 46
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 17
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 49
U.S. PROGRAM FOR TESTING LARGE SODIUM-WATER REACTION EFFECTS* 121639 P 22
ANALYSIS OF LARGE SODIUM-WATER REACTIONS IN THE UNITED STATES* 121642 P 22
RESULTS OF SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE U.S.* 121630 P 24
SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS* STUDY OF THE LIQUID 120154 P 24
HYDROGEN AND OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.* 121635 P 24
SAFETY ISSUES IN LICENSING COMMERCIAL LMFBR'S* 126472 P 8
ACCIDENTS* LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR 124601 P 4
LMFBR ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING* 126320 P 23
LMFBR FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CORE PUMP* 122502 P 30
DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL ANALYSIS* FATIGUE 123913 P 30
NUCLEAR POWER AND WEAPONS PROLIFERATION - THE THIN LINK* 126008 P 6
ITS FUEL CYCLE* SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF 124597 P 30
STUDY OF THE REACTIVITY EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS* A 129508 P 18
1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY* LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN. 127511 P 49
STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR* MOLTEN FUEL DOWNWARD 124201 P 11
ISSUES* LIQUID METAL FAST BREEDER REACTOR: DECISION PROCESS AND 118034 P 1
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS* 124027 P 25
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION* 124943 P 43
SODIUM-WATER LEAK AN EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO 120154 P 24
FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A 125292 P 39
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR* 129239 P 27
OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A LITERATURE SURVEY* USE OF WATER COOLANT FOR DECAY STORAGE 125292 P 39
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121100 P 2
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121100 P 38
LMFBR ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING* 126320 P 23
LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS* 124601 P 4
REPROCESSING, REFABRICATION* ENVIRONMENTAL ASSESSMENT OF LMFBR ADVANCED FUELS: A RADIOLOGICAL ANALYSIS OF FUEL 121348 P 30
WELDING DEVELOPMENT FOR LMFBR APPLICATIONS* 125285 P 31
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL* 118019 P 34
OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* CONDENSATION 130653 P 49
OF FUEL ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* CONDENSATION 130653 P 34
ASSESSMENT OF ACCIDENT ENERGETICS IN LMFBR CORE-DISRUPTIVE ACCIDENTS* 128856 P 23
BALANCE OF PLANT DESIGN CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. 32 PLBR 129918 P 88
MULTICOMPONENT, EULERIAN, NONCRITICALITY CODE FOR LMFBR DISRUPTED CORE ANALYSIS* N), IMPLICIT, MULTIFIELD, 122579 P 16
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. 122103 P 11
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. 122105 P 8
FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. 122105 P 46
THEORETICAL STUDIES* BLOCKAGES IN LMFBR FUEL ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND 129652 P 13
DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR FUEL ASSEMBLIES* TEMPERATURE 124707 P 12

CONTENTS

	Page	
FOREWORD	v	1/A7
PARTS AND METHOD OF INDEXING ABSTRACTS	vii	1/A9
ABSTRACT	ix	1/A11
INTRODUCTION	ix	
Design Philosophy	xii	1/A11
Instructions for Using Bibliography	xv	1/B1
References	xviii	1/B5
BIBLIOGRAPHY	xxi	1/B8
1. General Safety Considerations	1	1/B11
2. Siting of Nuclear Facilities	8	1/B12
3. Transportation and Handling of Radioactive Materials	9	1/C5
4. Aerospace Safety (inactive, not included)		1/C6
5. Heat Transfer and Thermal Hydraulics	10	1/C7
6. Reactor Transients, Kinetics, and Stability	16	1/C13
7. Fission Product Release, Transport, and Removal	19	1/D2
8. Sources of Energy Release under Accident Conditions	22	1/D5
9. Nuclear Instrumentation, Control, and Safety Systems	24	1/D7
10. Electrical Power Systems	28	1/D11
11. Containment of Nuclear Facilities	29	1/D12
12. Plant Safety Features — Reactor	36	1/E5
13. Plant Safety Features — Nonreactor	38	1/E7
14. Radionuclide Release, Disposal, Treatment, and Management (inactive, not included)		
15. Environmental Surveys, Monitoring, and Radiation Dose Measurements (inactive, not included)		
16. Meteorological Considerations	41	1/E10
17. Operational Safety and Experience	42	1/E11
18. Design, Construction, and Licensing	46	1/F1
19. Internal Exposure Effects on Humans Due to Radioactivity in the Environment (inactive, not included)		
20. Effects of Thermal Modifications on Ecological Systems (inactive, not included)		
21. Radiation Effects on Ecological Systems (inactive, not included)		
22. Safeguards of Nuclear Materials	51	1/F6
KEYWORD INDEX	53	1/F8
AUTHOR INDEX	61	1/G2
PERMUTED-TITLE INDEX	65	1/G6

COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL ASSEMBLY* 122799 P 11
THE CODE FRUMP* LMFBR FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING 122592 P 30
STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL* 120171 P 16
DEVELOPMENT OF SOLVENT EXTRACTION PROCESS FOR SPENT PHOEBUS/UHTREX: A PRELIMINARY
THE PUO2 DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS* 122839 P 38
LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND 127498 P 48
LMFBR NATURAL CIRCULATION VERIFICATION PROGRAM (NCVP)* 127584 P 13
CRACK PROPAGATION TESTING FOR LMFBR PIPING - PHASE II FINAL REPORT* 127566 P 32
OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* EVALUATION 121014 P 19
OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* EVALUATION 121014 P 36
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 17
DESIGN-RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 48
MECHANICAL PROPERTIES OF LMFBR PRIMARY PIPING MATERIALS* 120000 P 29
ANNULAR CORE PULSE REACTOR (ACPR)* LMFBR PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN THE 123318 P 16
LMFBR SELF-ACTIVATED SHUTDOWN SYSTEMS* 120969 P 26
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 19
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 36
SCALE FACILITY* LMFBR SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL- 124989 P 39
APPLICATION* LMFBR SPENT-FUEL CHARACTERIZATION FOR SHIPPING-CASK 127612 P 9
AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS*STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION 120154 P 24
HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL ASSEMBLY* 129918 P 14
TESTS IN SUPPORT OF LMFBR* 127823 P 23
SAFETY ISSUES IN LICENSING COMMERCIAL LMFBR*S* 126672 P 6
A LOOK AT ALTERNATIVE CORE DISRUPTION ACCIDENTS IN LMFBR*S* 123728 P 22
ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR*S* HYDRAULICALLY SUPPORTED 128334 P 26
VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER ACCIDENT IN LMFBR*S* SOME ASPECTS OF SUBASSEMBLY 125644 P 17
EBR-II: SOME CONSIDERATIONS FOR APPLICATION TO COMMERCIAL LMFBR*S* DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR 128323 P 44
APPLICATION OF CONTAINMENT CODES TO LMFBRS IN THE UNITED STATES* 127820 P 33
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 22
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 30
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 36
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 36
OF THE TRANSITION PHASE OF CORE-DISRUPTIVE ACCIDENTS IN LMFBRS* REVIEW 125632 P 17
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122105 P 2
LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122105 P 48
IN-SERVICE INSPECTION AND MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF 127315 P 44
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 22
A LOOK AT ALTERNATE CORE DISRUPTION ACCIDENTS IN LMFBRS* 126085 P 36
A LOOK AT ALTERNATIVE CORE DISRUPTION ACCIDENTS IN LMFBR*S* 123728 P 22
ASSESSMENT OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER* 124318 P 28
DATA ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW* SUMMARY AND EVALUATION OF TRANSIENT TEST 129931 P 34
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11
PHOEBUS/UHTREX: A PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL* 120171 P 16
REPROCESSING PROBLEMS AND THE PUO2 DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND 127498 P 48
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11

FUEL ROD MECHANICS PROGRAM* USERS MANUAL FOR THE BEHAVE-SST (STEADY STATE AND TRANSIENT) 128906 P 13
RESPONSE TO QUESTION 222.40 - INCORPORATION OF A MARGIN OF ERROR IN PREDICTIONS* 119876 P 46
ANALYSIS OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE SMR-300 MARK IA CORE WITH MODELING OF FAILURE INCOHERENCE* 129502 P 14
INFLUENCE OF PLUME RISE ON THE CONSEQUENCES OF RADIOACTIVE MATERIAL RELEASES* 124148 P 41
FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL* APPARATUS 118919 P 24
ENERGY PROGRAM EXECUTIVE SUMMARY - NEEDS FOR ENERGY-RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR-TERM 127504 P 32
MATERIALS SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING* 130851 P 35
MECHANICAL PROPERTIES OF LMFBR PRIMARY PIPING MATERIALS* 120000 P 29
IN A FAST REACTOR* MEASUREMENT OF THE ENERGY DISTRIBUTION OF THE GAMMA FIELD 121735 P 10
FUELS FOR FAST REACTOR SAFETY ANALYSIS* VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF STATE OF OXIDE 121738 P 25
MECHANICAL PROPERTIES OF LMFBR PRIMARY PIPING MATERIALS* 120000 P 29
MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT HEATING* 126529 P 31
FOR THE BEHAVE-SST (STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM* USERS MANUAL 128006 P 13
MATERIALS SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING* 130851 P 35
NUCLEAR REACTOR SAFETY - ANS 1977 WINTER MEETING* 130854 P 37
CYCLE* SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND ASPECTS OF ITS FUEL 124597 P 30
THE REACTIVITY EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS* A STUDY OF 129508 P 18
MWE. VOLUME 1 - EXECUTIVE SUMMARY* LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000 127511 P 49
FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID- METAL FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A 125292 P 39
STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR* ACCIDENT MOLTEN FUEL DOWNWARD 124281 P 11
LIQUID METAL FAST BREEDER REACTOR: DECISION PROCESS AND ISSUES* 118534 P 1
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS* 124927 P 25
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION* 124943 P 43
TUBULAR GAGE FOR A LIQUID- METAL-COOLED FAST BREEDER REACTOR* 129239 P 27
IRRADIATION* A SIMPLIFIED METHOD OF COMPUTING CLAD AND FUEL STRAIN AND STRESS DURING 130974 P 35
RISK-ASSESSMENT METHODOLOGY FOR FAST BREEDER REACTORS* 120096 P 1
APPLICATION OF FORSS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR BENCHMARK ANALYSIS* 121481 P 16
VALUES FOR ANNEALED 2.25 CR-1MO STEEL* A COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM 127484 P 32
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL CABLES* 123867 P 25
IRRADIATION OF MICROPHONES IN THE EBR-II CORE* 126416 P 26
OF METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO STEEL*A COMPARISON 127484 P 32
FISSION, BREEDER, REPROCESSING AND 'HAVE-NOTS'--ROSE OF MIT* 122621 P 2
COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL ASSEMBLY* 122799 P 11
TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (FFM) FACILITY* FABRICATION OF AN IMPROVED 129205 P 49
STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL ANALYSIS* FATIGUE DATA ON TYPE 304 123913 P 30
OVERPOWER ACCIDENTS IN THE SMR-300 MARK IA CORE WITH MODELING OF FAILURE INCOHERENCE* ANALYSIS OF HYPOTHETICAL 129502 P 14
STEADY STATE AND TRANSIENT CONDITIONS* MODELS OF FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER 125653 P 20
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR 'MONJU' SCALE MODELS* 120378 P 29
FFTF MIS/DHX PROTOTYPE MODULE TESTING IN SCTI FINAL REPORT* 121581 P 47

STRUCTURE IN THE LIQUID METAL A STUDY OF POST-ACCIDENT
A STUDY OF THE REACTIVITY EFFECT OF BUBBLE COLLAPSE IN
OF THE PRIMARY PROPOSALS FOR IN-SERVICE INSPECTION AND
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR *
ENERGY POLICY AND ENERGY PROJECTIONS: THE CASE OF A NUCLEAR
AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL
ENVIRONMENTAL TESTING OF CLASS 1E AC
SPACE-TIME KINETICS: FX2/VENUS-III*
DISRUPTED SIMMER-I: AN S(SUB N), IMPLICIT, MULTIFIELD,
FOR LMFBR DISRUPTED CORE SIMMER-I: AN S(SUB N), IMPLICIT,
FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION,
METAL FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000

RECRITICALITY CODE FOR LMFBR DISRUPTED SIMMER-I: AN S(SUB
TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM SODIUM-
OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE
RESPONSE TO QUESTION 001.406 -
FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL ASSEMBLY*
LMFBR
LMFBR NATURAL CIRCULATION VERIFICATION PROGRAM
RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 -
UNITED KINGDOM
TUNNEL STUDY* DETERMINATION OF A
THE
DEVELOPMENT. VOLUME 1 - NEAR-TERM EXECUTIVE SUMMARY -
AND DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF
NUCLEAR REACTORS - TO BREED OR
FISSION, BREEDER, REPROCESSING AND 'WAVE-
CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET
1976 ASME - ANS INTERNATIONAL CONFERENCE ON ADVANCED
SAFETY ASPECTS OF
PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN
ENERGY POLICY AND ENERGY PROJECTIONS: THE CASE OF A
PROLIFERATION WORRY THREATENS TOTAL

THE

CONCEPTUAL DESIGN DESCRIPTION, 3000-KWE SUBSEA
TESTING OF CLASS 1E AC MOTOR CONTROL CENTER FOR
FLOWER POWER--WILL A

LABORATORY* DECEMBER 1976 MONTHLY HIGHLIGHTS FOR OFFICE OF

FOR OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT
FUEL DYNAMICS LOSS-
RIDGE NATIONAL DECEMBER 1976 MONTHLY HIGHLIGHTS FOR

DISRUPTIVE ACCIDENT* CONDENSATION OF FUEL
DISRUPTIVE ACCIDENT* CONDENSATION OF FUEL
SEALS - 1969-1976*
SEALS - 1969-1976*
PHENIX CONSTRUCTION AND
PHENIX CONSTRUCTION AND
EBR-II
FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION AND
ONE YEAR OF PHENIX
THREE YEARS OF PHENIX
FFTF
FFTF OPERATIONS: INITIAL
PROLIFERATION WORRY THREATENS TOTAL NUCLEAR
ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT
MODELING OF FAILURE INCOHERENCE* ANALYSIS OF HYPOTHETICAL

CHARACTERISTICS OF AGGLOMERATES OF SODIUM
PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF STATE OF
HYDROGEN AND

LMFBR FUEL PIN BEHAVIOR: A LIMITED
AND MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR
PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES.
PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES.
COATED FUEL
CHARACTERISTICS OF AGGLOMERATES OF SODIUM OXIDE AEROSOL
SODIUM BOILING EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW
LMFBR PROMPT BURST EXCURSION (
THE NEED FOR HIGH

MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL SHIELD 124281 P 11
MOLTEN LIQUID METAL COOLED REACTORS* 129500 P 18
MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR PART 127315 P 44
MONJU* SCALE MODELS* 120376 P 29
MORATORIUM* 121153 P 2
MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW* SUMMARY 129931 P 34
MOTOR CONTROL CENTER FOR NUCLEAR POWER PLANTS* 127832 P 33
MULTI-FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH 126688 P 12
MULTICOMPONENT, EULERIAN, RECRITICALITY CODE FOR LMFBR 122579 P 16
MULTIFIELD, MULTICOMPONENT, EULERIAN, RECRITICALITY CODE 122579 P 16
MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL ANALYSIS* 123913 P 30
NME. VOLUME 1 - EXECUTIVE SUMMARY* LIQUID 127511 P 40

N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, EULERIAN, 122579 P 16
NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, HEAT 120349 P 10
NATIONAL LABORATORY* DECEMBER 1976 MONTHLY HIGHLIGHTS FOR 120340 P 19
NATURAL CIRCULATION DECAY HEAT REMOVAL* 119866 P 46
NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED 129518 P 14
NATURAL CIRCULATION VERIFICATION PROGRAM (NCVP)* 127684 P 13
NCVP* 127684 P 13
NEAR-TERM ENERGY PROGRAM* SUMMARY - NEEDS FOR ENERGY- 127504 P 32
NEARER DECISION ON COMMERCIAL-SIZE FAST BREEDER REACTOR* 122830 P 43
NECESSARY WEIGHT FOR A ATTACK CLOSE TO A BUILDING--A WIND 118587 P 51
NEED FOR HIGH PERFORMANCE BREEDER REACTORS* 124565 P 4
NEEDS FOR ENERGY-RELATED MATERIALS RESEARCH AND 127584 P 32
NEW PLUTONIUM FACILITIES* DECONTAMINATION 119148 P 38
NOT TO BREED* 120413 P 6
NOTS*--ROSE OF MIT* 122621 P 2
NOZZLE FLOW TESTS* 125973 P 48
NUCLEAR ENERGY SYSTEMS* 124774 P 51
NUCLEAR ENERGY* 119262 P 1
NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)* 120966 P 38
NUCLEAR MORATORIUM* 121153 P 2
NUCLEAR OPTION* 123381 P 3
NUCLEAR POWER AND THE PUBLIC INTEREST (EXTRACTED)* 123230 P 3
NUCLEAR POWER AND WEAPONS PROLIFERATION - THE THIN LINK* 126908 P 6
NUCLEAR POWER DILEMMA* 129975 P 51
NUCLEAR POWER ISSUES AND CHOICES* 124320 P 3
NUCLEAR POWER PLANT* 127503 P 49
NUCLEAR POWER PLANTS* ENVIRONMENTAL 127832 P 33
NUCLEAR POWER SLOWDOWN IN BRITAIN HELP ANYONE * 128881 P 7
NUCLEAR REACTOR SAFETY - ANS 1977 WINTER MEETING* 130854 P 37
NUCLEAR REACTORS - TO BREED OR NOT TO BREED* 120413 P 6
NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE NATIONAL 120340 P 19

OAK RIDGE NATIONAL LABORATORY* 1976 MONTHLY HIGHLIGHTS 120340 P 19
OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11
OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK 120340 P 19
ONE YEAR OF PHENIX OPERATION* 116400 P 42
ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE- 130663 P 23
ONTO THE ABOVE-CORE STRUCTURE DURING AN LMFBR CORE- 130653 P 34
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE 121754 P 30
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE 121754 P 42
OPERATING EXPERIENCE* 118532 P 1
OPERATING EXPERIENCE* 118532 P 42
OPERATING EXPERIENCE* 127246 P 44
OPERATION OF CLINCH RIVER BREEDER* 121273 P 47
OPERATION* 116400 P 42
OPERATION* 127247 P 44
OPERATIONS: INITIAL OPERATOR TRAINING SIMULATOR PROGRAM* 130967 P 45
OPERATOR TRAINING SIMULATOR PROGRAM* 130967 P 45
OPTION* 123381 P 3
OVERPOWER ACCIDENT IN LMFBR'S* SUME 125644 P 17
OVERPOWER ACCIDENTS IN THE SNR-300 MARK IA CORE WITH 124682 P 14
OVERVIEW OF CORE DISRUPTIVE ACCIDENTS* 127816 P 37
OXIDE AEROSOL PARTICLES* 129277 P 21
OXIDE FUELS FOR FAST REACTOR SAFETY ANALYSIS* VAPOUR 121738 P 25
OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.* 121635 P 24

PARAMETER SURVEY USING THE CODE FRUMP* 122692 P 30
PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED FAST 127315 P 44
PART 1: SODIUM TEMPERATURE AND STEAM CYCLE CONDITIONS* 130674 P 15
PART 3: BALANCE OF PLANT ENGINEERING SUPPORT STUDIES* 130676 P 50
PARTICLES - FABRICATION* 128000 P 33
PARTICLES* 129277 P 21
PATTERNS AND TWO PHASE PRESSURE DROP* 129806 P 14
PDF) EXPERIMENTS IN THE ANNULAR CORE PULSE REACTOR (ACPR)* 123314 P 16
PERFORMANCE BREEDER REACTORS* 124565 P 4

CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN PROJECTS
CRACK PROPAGATION TESTING FOR LMFBR PIPING -
PART 1: SODIUM PROTOTYPE LARGE BREEDER REACTOR.
PART 3: BALANCE OF PLANT PROTOTYPE LARGE BREEDER REACTOR.
QUARTERLY PROGRESS REPORT ON THE ADVANCED TWO-
REVIEW OF THE TRANSITION
EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO
BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH

CHARACTERISTICS AND BEHAVIOUR OF THE
ONE YEAR OF
THREE YEARS OF
SEISMIC ANALYSIS FOR THE SUPER-
UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF
UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF
FOR TRANSIENT TESTS OF LMFBR FUEL*
THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN IN-
FRUMP* LMFBR FUEL
SODIUM BOILING EXPERIMENTS IN A SEVEN-
HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-
THEORETICAL INTERPRETATION OF SCARABEE SINGLE
TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-
FFN) FACILITY* FABRICATION OF AN IMPROVED TUBE-TO-
RESPONSE TO QUESTION 001.427 - RELIABILITY ASSESSMENT FOR
CRACK PROPAGATION TESTING FOR LMFBR
MECHANICAL PROPERTIES OF LMFBR PRIMARY
FUEL AEROSOL SIMULANT TEST (FAST)
HUMAN FACTORS IN CRBRP DESIGN AND
HUMAN FACTORS IN CRBRP DESIGN AND
PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF
LIQUID METAL FAST BREEDER REACTOR CONCEPTUAL
DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER
CLINCH RIVER BREEDER REACTOR
HEAT REJECTION FOR THE CLINCH RIVER BREEDER REACTOR
DESIGN DESCRIPTION, 3000-KWE SUBSEA NUCLEAR POWER
OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR
OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR
INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER
INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR POWER
OF CLASS 1E AC MOTOR CONTROL CENTER FOR NUCLEAR POWER
EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-
RELEASES* INFLUENCE OF
AND DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF NEW
REPROCESSING PROBLEMS THE PUO2 DISSOLUTION PROBLEM FOR LWR

MORATORIUM* ENERGY
SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK B:
AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST A STUDY OF

NUCLEAR
NUCLEAR
THE NUCLEAR
NUCLEAR
CONCEPTUAL DESIGN DESCRIPTION, 3000-KWE SUBSEA NUCLEAR
RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR
RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR
TESTING OF CLASS 1E AC MOTOR CONTROL CENTER FOR NUCLEAR
ASSESSMENT OF THE THORIUM FUEL CYCLE IN
FLOWER POWER--WILL A NUCLEAR
OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC
ANYONE * FLOWER
INCLUDING INTERSUBASSEMBLY HEAT TRANSFER* THE
TO QUESTION 222.49 - INCORPORATION OF A MARGIN OF ERROR IN
CRITICAL EXPERIMENTS* A
TESTS OF LMFBR FUEL* PHOEBUS/UHTREX: A
REPROCESSING WASTES (IN FRENCH)* PROBLEMS RAISED BY THE
IN A SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO PHASE
OXIDE FUELS FOR FAST REACTOR SAFETY ANALYSIS* VAPOUR
DESIGN OF THE US-CRBRP SODIUM-WATER REACTION
OF SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE
MECHANICAL PROPERTIES OF LMFBR
CHARACTERIZATION AND AGING KINETICS STUDY OF GAMMA
FABRICATION AND REPROCESSING PROBLEMS THE PUO2 DISSOLUTION
RECYCLE AND LMFBR FUELS: FABRICATION AND REPROCESSING
NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)*
METAL TECHNOLOGY IN ENERGY PRODUCTION*
LIQUID METAL FAST BREEDER REACTOR: DECISION
LABORATORY DEVELOPMENT OF SOLVENT EXTRACTION
THROUGH SEPTEMBER 1976* FISSION
CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY
RESPONSE TO QUESTION 001.398 - RELEASE OF FISSION
DEVELOPMENT IN JAPAN*
STATUS AND PROSPECTS OF THE FRENCH FAST BREEDER REACTOR

PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF PLANT DESIGN 129918 P 50
PHASE II FINAL REPORT* 127586 P 32
PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. 130874 P 15
PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. 130876 P 50
PHASE INSTRUMENTATION PROGRAM FOR JANUARY-MARCH 1977* 127835 P 19
PHASE OF CORE-DISRUPTIVE ACCIDENTS IN LMFBRS* 125632 P 17
PHASE PRESSURE DROP* SODIUM BOILING 129506 P 14
PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE 128622 P 6
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE* 118532 P 1
PHENIX CONSTRUCTION AND OPERATING EXPERIENCE* 118532 P 42
PHENIX FUEL ELEMENT* 124616 P 43
PHENIX OPERATION* 116400 P 42
PHENIX OPERATION* 127247 P 44
PHENIX REACTOR* 126678 P 8
PHENIX* SAFETY CONCLUSIONS FROM START- 126673 P 18
PHENIX* SAFETY CONCLUSIONS FROM START- 126673 * 44
PHOEBUS/UHTREX: A PRELIMINARY STUDY OF A LOW-COST FACILITY 120171 P 16
PILE BOILING EXPERIMENTS* 129504 P 14
PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE 122592 P 30
PIN BUNDLE: FLOW PATTERNS AND TWO PHASE PRESSURE DROP* 129506 P 14
PIN ELECTRICALLY HEATED FUEL ASSEMBLY* NATURAL CIRCULATION 129518 P 14
PIN IN-PILE BOILING EXPERIMENTS* 129504 P 14
PIN SIMULATED LMFBR FUEL ASSEMBLIES* 124787 P 12
PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (129205 P 49
PIPE SLEEVES* 119868 P 46
PIPING - PHASE II FINAL REPORT* 127586 P 32
PIPING MATERIALS* 120000 P 29
PLAN* 127992 P 21
PLANNING FOR SAFETY* 126653 P 5
PLANNING FOR SAFETY* 122559 P 25
PLANT DESIGN CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN 129918 P 50
PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY* 127511 P 49
PLANT ENGINEERING SUPPORT STUDIES* PHASE II: CONCEPTUAL 130876 P 50
PLANT SYSTEM DESIGN DESCRIPTION* 129944 P 50
PLANT TECHNICAL REVIEW, SUMMER 1977* 127515 P 6
PLANT* 124126 P 48
PLANT* CONCEPTUAL 127503 P 49
PLANTS* EVALUATION 121014 P 19
PLANTS* EVALUATION 121014 P 36
PLANTS* DESIGN-RELATED 126176 P 17
PLANTS* DESIGN-RELATED 126176 P 48
PLANTS* ENVIRONMENTAL TESTING 127832 P 33
PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS* ERDA- 129918 P 50
PLUG FREEZE SEALS - 1969-1975* 121754 P 30
PLUG FREEZE SEALS - 1969-1975* 121754 P 42
PLUME RISE ON THE CONSEQUENCES OF RADIOACTIVE MATERIAL 124148 P 41
PLUTONIUM FACILITIES* DECONTAMINATION 119248 P 38
PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND 127498 P 40
PLUTONIUM: FACTS AND INFERENCES* 123864 P 20
POLICY AND ENERGY PROJECTIONS: THE CASE OF A NUCLEAR 121153 P 2
POST-ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 1975- 122103 P 11
POST-ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE 124281 P 11
POSTACCIDENT HEAT REMOVAL TECHNOLOGY* 120963 P 10
POWER AND THE PUBLIC INTEREST (EXTRACTED)* 123230 P 3
POWER AND WEAPONS PROLIFERATION - THE THIN LINK* 126908 P 6
POWER DILEMMA* 129975 P 51
POWER ISSUES AND CHOICES* 124320 P 3
POWER PLANT* 127503 P 49
POWER PLANTS* DESIGN- 126176 P 17
POWER PLANTS* DESIGN- 126176 P 48
POWER PLANTS* ENVIRONMENTAL 127832 P 33
POWER REACTORS* 126357 P 39
POWER SLOWDOWN IN BRITAIN HELP ANYONE * 128881 P 7
POWER* ASSESSMENT 124318 P 28
POWER--WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN HELP 128881 P 7
PREDICTION OF TEMPERATURE DISTRIBUTION OF A SUBASSEMBLY 128456 P 13
PREDICTIONS* RESPONSE 119876 P 46
PRELIMINARY ANALYSIS OF THE ANL PROPOSED SAFETY RELATED 124107 P 17
PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT 120171 P 16
PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR FUEL 120966 P 38
PRESSURE DROP* SODIUM BOILING EXPERIMENTS 129506 P 14
PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF STATE OF 121738 P 25
PRESSURE RELIEF SYSTEM* 121641 P 29
PRIMARY CONTAINMENT OF SODIUM COOLED FAST REACTORS* 127315 P 44
PRIMARY PIPING MATERIALS* 120000 P 29
PRIME ALLOYS FOR BREEDER REACTORS* 127583 P 32
PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: 127498 P 40
PROBLEMS AND THEIR RESOLUTION* PROBLEM FOR LWR PLUTONIUM 127498 P 40
PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN 120966 P 38
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID 124943 P 43
PROCESS AND ISSUES* 118534 P 1
PROCESS FOR SPENT LMFBR FUELS* 122839 P 38
PRODUCT TRANSPORT ANALYSIS, QUARTERLY PROGRESS REPORT JULY 123859 P 28
PRODUCTION* PROCEEDINGS OF THE INTERNATIONAL 124943 P 43
PRODUCTS DURING CLEANING OF LARGE COMPONENTS* 119864 P 46
PROGRAMME AND CURRENT STATUS OF FAST BREEDER REACTOR 124481 P 3
PROGRAMME* 124494 P 4

HIGHLIGHTS FOR OFFICE OF NUCLEAR REGULATORY RESEARCH ENERGY POLICY AND ENERGY — PROGRAMS AT OAK RIDGE NATIONAL LABORATORY* 1976 MONTHLY 120340 P 19
PLANT DESIGN CHARACTERISTICS* ERDA-EPRI LMFBR DESIGN NUCLEAR POWER AND WEAPONS — PROJECTIONS: THE CASE OF A NUCLEAR MORATORIUM* 121153 P 2
CORE PULSE REACTOR (ACPR)* LMFBR — PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF 129918 P 50
REPORT* CRACK — PROLIFERATION - THE THIN LINK* 126908 P 6
RESULTS OF SMALL LEAK BEHAVIOR AND DAMAGE MECHANICAL — PROLIFERATION WORRY THREATENS TOTAL NUCLEAR OPTION* 123381 P 3
SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY A PRELIMINARY ANALYSIS OF THE ANL — PROMPT BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR 123318 P 16
STATUS AND — PROPAGATION TESTING FOR LMFBR PIPING - PHASE II FINAL 127586 P 32
STATUS AND — PROPAGATION TESTS IN THE U.S.* 121630 P 24
ASSESSMENT OF A HIGH-INTEGRITY — PROPERTIES OF LMFBR PRIMARY PIPING MATERIALS* 120000 P 29
STRUCTURAL SHOCK TESTS OF — PROPOSALS FOR IN-SERVICE INSPECTION AND MONITORING OF 127315 P 44
BRITAIN'S — PROPOSED SAFETY RELATED CRITICAL EXPERIMENTS* 124107 P 17
DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM — PROSPECTS AND IMPACTS OF BREEDER COMMERCIALIZATION* 118533 P 1
DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF — PROSPECTS OF THE FRENCH FAST BREEDER REACTOR PROGRAMME* 124494 P 4
FFTF MTS/DHX — PROSPECTS OF THERMAL BREEDERS* 124692 P 5
NUCLEAR POWER AND THE — PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER* 124318 P 28
BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR CORE — PROTOTYPE EBR 'MONJU' SCALE MODELS* 120378 P 29
DISASSEMBLY, AND EXAMINATION OF FERMI SECONDARY SODIUM — PROTOTYPE FAST REACTOR* 124369 P 42
LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THE — PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL 130874 P 15
PROTOTYPE LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL 130876 P 50
PROTOTYPE MODULE TESTING IN SCTI FINAL REPORT* 121581 P 47
PUBLIC INTEREST (EXTRACTED)* 123230 P 3
PULSE REACTOR (ACPR)* LMFBR PROMPT 123318 P 16
PUMP* SODIUM REMOVAL, 129708 P 45
PUO2 DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND 127498 P 40
PURITY OF EBR-II SODIUM: 1967-1974* 121474 P 42

ASSESSMENT STUDY QUARTERLY PROGRESS REPORT FOR THIRD — QUARTER FISCAL 1977* THORIUM 131030 P 51
CLEANING OF LARGE COMPONENTS* RESPONSE TO — QUESTION 001.398 - RELEASE OF FISSION PRODUCTS DURING 119864 P 46
RESPONSE TO — QUESTION 001.406 - NATURAL CIRCULATION DECAY HEAT REMOVAL* 119865 P 46
RESPONSE TO — QUESTION 001.427 - RELIABILITY ASSESSMENT FOR PIPE SLEEVES* 119868 P 46
CRYOGENIC STILL* RESPONSE TO — QUESTION 011.14 - BOTTLING OF AR-39 AND KR-85 FROM 120928 P 47
PREDICTIONS* RESPONSE TO — QUESTION 222.40 - INCORPORATION OF A MARGIN OF ERROR IN 119876 P 46
RESPONSE TO — QUESTION 222.47 - SHUTDOWN SYSTEM COMPONENT FAILURE* 119877 P 46
HABITABILITY* RESPONSE TO — QUESTION 310.32 - SODIUM FIRE EFFECT ON CONTROL ROOM 119899 P 47

INFLUENCE OF PLUME RISE ON THE CONSEQUENCES OF — RADIOACTIVE MATERIAL RELEASES* 124148 P 41
AND ENVIRONMENTAL ASSESSMENT OF LMFBR ADVANCED FUELS: A — RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, REFABRICATION 121348 P 38
FUEL REPROCESSING WASTES (IN FRENCH)* PROBLEMS — RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR 130966 P 38
EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID SODIUM-HYDROGEN — REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION 120154 P 24
U.S. PROGRAM FOR TESTING LARGE SODIUM-WATER — REACTION EFFECTS* 121639 P 22
DESIGN OF THE US-CRBRP SODIUM-WATER — REACTION PRESSURE RELIEF SYSTEM* 121641 P 29
ANALYSIS OF LARGE SODIUM-WATER — REACTIONS IN THE UNITED STATES* 121642 P 22
METAL COOLED REACTORS* A STUDY OF THE — REACTIVITY EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID 129508 P 18
BURST EXCURSION (PBF) EXPERIMENTS IN THE ANNULAR CORE PULSE — REACTOR (ACPR)* LMFBR PROMPT 123318 P 16
SAFETY OF THE LIQUID METAL COOLED FAST BREEDER — REACTOR AND ASPECTS OF ITS FUEL CYCLE* 124597 P 30
OF FORSS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST — REACTOR BENCHMARK ANALYSIS* APPLICATION 121481 P 16
BREEDER — REACTOR CALLED 'BARGAIN'* 122625 P 2
EXECUTIVE SUMMARY* LIQUID METAL FAST BREEDER — REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - 127511 P 49
PROGRAMME AND CURRENT STATUS OF FAST BREEDER — REACTOR DEVELOPMENT IN JAPAN* 124481 P 3
THE USSR FAST — REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT STATE* 124530 P 4
CLINCH RIVER BREEDER — REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE FLOW TESTS* 125973 P 48
FAST — REACTOR FUEL REPROCESSING IN THE UK* 124449 P 39
MODELS OF FISSION GAS BEHAVIOR IN FAST — REACTOR FUELS UNDER STEADY STATE AND TRANSIENT CONDITIONS* 125653 P 20
CLINCH RIVER BREEDER — REACTOR PLANT TECHNICAL REVIEW, SUMMER 1977* 127515 P 6
HEAT REJECTION FOR THE CLINCH RIVER BREEDER — REACTOR PLANT* 124126 P 48
STATUS AND PROSPECTS OF THE FRENCH FAST BREEDER — REACTOR PROGRAMME* 124494 P 4
NUCLEAR — REACTOR SAFETY - ANS 1977 WINTER MEETING* 130854 P 37
TO 7000 K AND EQUATION OF STATE OF OXIDE FUELS FOR FAST — REACTOR SAFETY ANALYSIS* VAPOUR PRESSURE MEASUREMENTS 121738 P 25
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST — REACTOR SAFETY STUDIES* 126864 P 12
GAS-COOLED FAST — REACTOR SAFETY* 124676 P 36
COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER — REACTOR SPENT FUEL ELEMENTS--A LITERATURE SURVEY* OF WATER 125292 P 39
EXPERIMENTAL STUDY ON DYNAMIC RESPONSE OF — REACTOR VESSEL TO AN HCDA* 128659 P 34
SUPERPHENIX: A FULL SCALE BREEDER — REACTOR* 126870 P 5
SEISMIC ANALYSIS FOR THE SUPER-PHENIX — REACTOR* 126678 P 8
TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER — REACTOR* 129239 P 27
BRITAIN'S PROTOTYPE FAST — REACTOR* 124369 P 43
KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST BREEDER — REACTOR* UNITED 122838 P 43
OF THE ENERGY DISTRIBUTION OF THE GAMMA FIELD IN A FAST — REACTOR* MEASUREMENT 121735 P 10
THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER — REACTOR* ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH 124281 P 11
STUDIES. PART 1: SODIUM PROTOTYPE LARGE BREEDER — REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF 130874 P 15
STUDIES. PART 3: BALANCE OF PLANT PROTOTYPE LARGE BREEDER — REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF 130876 P 50
LIQUID METAL FAST BREEDER — REACTOR: DECISION PROCESS AND ISSUES* 118534 P 1
NUCLEAR — REACTORS - TO BREED OR NOT TO BREED* 128413 P 6
STUDIES, DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST BREEDER — REACTORS IN JAPAN* 129737 P 49
STRUCTURAL RESPONSE OF FAST BREEDER — REACTORS TO HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 120625 P 29
TO TRANSIENT ANALYSES OF GAS COOLED FAST BREEDER — REACTORS WITH DIGITAL COMPUTER CODES (IN GERMAN)* 120341 P 10
RISK-ASSESSMENT METHODOLOGY FOR FAST BREEDER — REACTORS* 129096 P 1
THE NEED FOR HIGH PERFORMANCE BREEDER — REACTORS* 124565 P 4
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER — REACTORS* 124927 P 25
ASSESSMENT OF THE THORIUM FUEL CYCLE IN POWER — REACTORS* 126357 P 39
ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED FAST — REACTORS* 123197 P 16

OF COMPUTER CODES FOR THE SAFETY ANALYSIS OF FAST BREEDER REACTORS* 130829 P 18
AND AGING KINETICS STUDY OF GAMMA PRIME ALLOYS FOR BREEDER REACTORS* A COMPENDIUM 127583 P 32
EFFECT OF BUBBLE COLLAPSE IN MOLTEN LIQUID METAL COOLED REACTORS* CHARACTERIZATION 129508 P 18
OR PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED FAST REACTORS* A STUDY OF THE REACTIVITY 127315 P 44
S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, EULERIAN, RECRITICALITY CODE FOR LMFBR DISRUPTED CORE ANALYSIS*I: AN 122579 P 16
PROBLEMS THE PJO2 DISSOLUTION PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND REPROCESSING 127498 P 40
FUELS: A RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, REFABRICATION AND TRANSPORTATION* OF LMFBR ADVANCED 121348 P 38
ON TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND STATISTICAL ANALYSIS* FATIGUE DATA 123913 P 30
DECEMBER 1976 MONTHLY HIGHLIGHTS FOR OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE NATIONAL 120340 P 19
HEAT REJECTION FOR THE CLINCH RIVER BREEDER REACTOR PLANT* 124126 P 48
A PRELIMINARY ANALYSIS OF THE ANL PROPOSED SAFETY RELATED CRITICAL EXPERIMENTS* 124107 P 17
POWER PLANTS* DESIGN- RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR 126176 P 17
POWER PLANTS* DESIGN- RELATED INHERENT SAFETY CHARACTERISTICS IN LARGE LMFBR 126176 P 48
NEAR-TERM ENERGY EXECUTIVE SUMMARY - NEEDS FOR ENERGY- RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - 127504 P 32
BREEDER* FINAL ENVIRONMENTAL STATEMENT RELATED TO CONSTRUCTION AND OPERATION OF CLINCH RIVER 121273 P 47
LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS* 124601 P 4
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR SAFETY STUDIES* 126864 P 12
REACTORS* ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED FAST 123197 P 16
COMPONENTS* RESPONSE TO QUESTION 001.398 - RELEASE OF FISSION PRODUCTS DURING CLEANING OF LARGE 119864 P 46
ATMOSPHERE* EFFECT OF DURATION OF RELEASE ON THE DISPERSION OF EFFLUENT RELEASE ON THE DISPERSION OF EFFLUENT RELEASED TO THE 130540 P 41
EFFECT OF DURATION OF RELEASE ON THE DISPERSION OF EFFLUENT RELEASED TO THE ATMOSPHERE* 130540 P 41
OF PLUME RISE ON THE CONSEQUENCES OF RADIOACTIVE MATERIAL RELEASES* INFLUENCE 124148 P 41
STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS* 120154 P 24
SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975- 122105 P 2
SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 1, 1975- 122105 P 48
RESPONSE TO QUESTION 001.427 - RELIABILITY ASSESSMENT FOR PIPE SLEEVES* 119868 P 46
RELIABILITY PROGRAM FOR SHUTDOWN HEAT REMOVAL* 121327 P 10
FFTF ELECTRICAL SYSTEM INSTRUMENTATION* RELIABILITY STUDY* 122043 P 28
UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-CORE 127647 P 26
DESIGN OF THE US-CRBRP SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM* 121641 P 29
REACTORS* REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER 124927 P 25
POSTACCIDENT HEAT REMOVAL TECHNOLOGY* 120953 P 10
RELIABILITY PROGRAM FOR SHUTDOWN HEAT REMOVAL* 121327 P 10
TO QUESTION 001.406 - NATURAL CIRCULATION DECAY HEAT REMOVAL* RESPONSE 119866 P 46
LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 1975-SEPTEMBER 30, 1976* 122103 P 11
SODIUM PUMP* SODIUM REMOVAL, DISASSEMBLY, AND EXAMINATION OF FERMI SECONDARY 129708 P 45
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11
CR-1MO STEEL* A COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 127484 P 32
FISSION, BREEDER, REPROCESSING AND 'HAVE-NOTS'--ROSE OF MIT* 122621 P 2
FAST REACTOR FUEL REPROCESSING IN THE UK* 124449 P 39
FOR LWR PLUTONIUM RECYCLE AND LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR RESOLUTION* PROBLEM 127498 P 40
BY THE PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)* PROBLEMS RAISED 120966 P 38
OF LMFBR ADVANCED FUELS: A RADIOLOGICAL ANALYSIS OF FUEL REPROCESSING, REFABRICATION AND TRANSPORYATION* ASSESSMENT 121348 P 38
LMFBR SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-SCALE FACILITY* 124989 P 39
DESIGN REQUIREMENTS FOR THE SNR-300 CONTAINMENT SYSTEM* 128326 P 34
EXECUTIVE SUMMARY - NEEDS FOR ENERGY-RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR-TERM ENERGY 127504 P 32
1976 MONTHLY HIGHLIGHTS FOR OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK RIDGE NATIONAL LABORATORY* 120340 P 19
LICENSING DECISIONS AND SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS* 124601 P 4
FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR RESOLUTION* PROBLEM FOR LWR PLUTONIUM RECYCLE AND LMFBR 127498 P 40
DISRUPTIVE ACCIDENTS* STRUCTURAL RESPONSE OF FAST BREEDER REACTORS TO HYPOTHETICAL CORE 126625 P 29
EXPERIMENTAL STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL TO AN HCDA* 128659 P 34
MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT HEATING* 126529 P 31
INTERACTION* THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-DUCT 127686 P 33
DURING CLEANING OF LARGE COMPONENTS* RESPONSE TO QUESTION 001.398 - RELEASE OF FISSION PRODUCTS 119864 P 46
HEAT REMOVAL* RESPONSE TO QUESTION 001.406 - NATURAL CIRCULATION DECAY 119866 P 46
PIPE SLEEVES* RESPONSE TO QUESTION 001.427 - RELIABILITY ASSESSMENT FOR 119868 P 46
FROM CRYOGENIC STILL* RESPONSE TO QUESTION 011.14 - BOTTLING OF AR-39 AND KR-85 120928 P 47
ERROR IN PREDICTIONS* RESPONSE TO QUESTION 222.40 - INCORPORATION OF A MARGIN OF 119876 P 46
FAILURE* RESPONSE TO QUESTION 222.47 - SHUTDOWN SYSTEM COMPONENT 119877 P 46
CONTROL ROOM HABITABILITY* RESPONSE TO QUESTION 310.32 - SODIUM FIRE EFFECT ON 119899 P 47
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED CORE RESTRAINT SYSTEM* 129945 P 50
EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW* SUMMARY AND 129931 P 34
TESTS IN THE U.S.* RESULTS OF SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION 121630 P 24
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 30
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 36
BLOCKAGES IN LMFBR FUEL ASSEMBLIES - A RETENTION OF GASEOUS ISOTOPES* 124541 P 28
ACCIDENTS IN LMFBRS* REVIEW OF EXPERIMENTAL AND THEORETICAL STUDIES* 128452 P 13
CLINCH RIVER BREEDER REACTOR PLANT TECHNICAL REVIEW OF THE TRANSITION PHASE OF CORE-DISRUPTIVE 125632 P 17
FOR OFFICE OF NUCLEAR REGULATORY RESEARCH PROGRAMS AT OAK REVIEW, SUMMER 1977* 127515 P 6
INFLUENCE OF PLUME RIDGE NATIONAL LABORATORY*DECEMBER 1976 MONTHLY HIGHLIGHTS 120340 P 19
COMMUNICATIONS SYSTEMS CLINCH RISE ON THE CONSEQUENCES OF RADIOACTIVE MATERIAL RELEASES* 124148 P 41
FLOW TESTS* CLINCH RISK-ASSESSMENT METHODOLOGY FOR FAST BREEDER REACTORS* 120096 P 1
CLINCH RIVER BREEDER PLANT SYSTEM DESIGN DESCRIPTION* 129944 P 50
HEAT REJECTION FOR THE CLINCH RIVER BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE 125973 P 48
STATEMENT RELATED TO CONSTRUCTION AND OPERATION OF CLINCH RIVER BREEDER REACTOR PLANT TECHNICAL REVIEW, SUMMER 1977* 127515 P 6
MANUAL FOR THE BEHAVE-BST (STEADY STATE AND TRANSIENT) FUEL RIVER BREEDER REACTOR PLANT* 124126 P 46
LMFBR ACCIDENT ENERGETICS AND THEIR RIVER BREEDER* FINAL ENVIRONMENTAL 121273 P 47
RESPONSE TO QUESTION 310.32 - SODIUM FIRE EFFECT ON CONTROL ROD MECHANICS PROGRAM* USERS 120006 P 13
FISSION, BREEDER, REPROCESSING AND 'HAVE-NOTS'-- ROLE IN LICENSING* 128320 P 23
OPERATING EXPERIENCE WITH THE EBR-II ROOM HABITABILITY* 119899 P 47
OPERATING EXPERIENCE WITH THE EBR-II ROSE OF MIT* 122621 P 2
STRUCTURAL WELDMENTS* CREEP DEFORMATION AND ROTATING-PLUG FREEZE SEALS - 1969-1976* 121754 P 30
A COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS ROTATING-PLUG FREEZE SEALS - 1969-1976* 121754 P 42
RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS STEEL 127472 P 31
RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO STEEL* 127484 P 32

RECRITICALITY CODE FOR LMFBR DISRUPTED CORE SIMMER-I: AN
SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY
NUCLEAR REACTOR
A COMPENDIUM OF COMPUTER CODES FOR THE
K AND EQUATION OF STATE OF OXIDE FUELS FOR FAST REACTOR
DESIGN-RELATED INHEREMT
DESIGN-RELATED INHERENT
ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX*
ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX*
FAIL-
ASPECTS OF ITS FUEL CYCLE*
A PRELIMINARY ANALYSIS OF THE ANL PROPOSED
LICENSING DECISIONS AND
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR
HUMAN FACTORS IN CRBRP DESIGN AND PLANNING FOR
GAS-COOLED FAST REACTOR
AEROSOL
SUPERPHENIX: A FULL
LMFBR SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-
CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED FULL-
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR 'MONJU'
THEORETICAL INTERPRETATION OF
MATERIALS
TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER
FFTF HTS/DHX PROTOTYPE MODULE TESTING IN
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE
OPERATING EXPERIENCE WITH THE EBR-II ROTATING-PLUG FREEZE
SODIUM REMOVAL, DISASSEMBLY, AND EXAMINATION OF FERMI
THE FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, FUSION
VOLUME I - ANALYSIS TECHNIQUES*
PROPOSALS FOR IN-SERVICE INSPECTION AND MONITORING OF
LMFBR
BENCHMARK ANALYSIS* APPLICATION OF FORSS
LOCATED WITHIN OR PART OF THE PRIMARY PROPOSALS FOR IN-
* SODIUM BOILING EXPERIMENTS IN A
ENERGY RELEASE FROM
ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL
SPENT FUEL
LMFBR SPENT-FUEL CHARACTERIZATION FOR
STRUCTURAL
RELIABILITY PROGRAM FOR
RESPONSE TO QUESTION 222.47 -
HYDRAULICALLY SUPPORTED ABSORBER BALLS
LMFBR SELF-ACTIVATED
REMOTE
MULTICOMPONENT, EULERIAN, RECRITICALITY CODE FOR LMFBR
STRESS DURING IRRADIATION* A
FUEL AEROSOL
FUEL NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A
TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-PIN
FFTF OPERATIONS: INITIAL OPERATOR TRAINING
THEORETICAL INTERPRETATION OF SCARABEE
UNITED KINGDOM WEARS DECISION ON COMMERCIAL-
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY
EX-VESSEL CORE RETENTION CONCEPT FOR EARLY
TO QUESTION 301.427 - RELIABILITY ASSESSMENT FOR PIPE
FLOWER POWER--WILL A NUCLEAR POWER
U.S.* RESULTS OF
DESIGN REQUIREMENTS FOR THE
ANALYSIS OF HYPOTHETICAL OVERPOWER ACCIDENTS IN THE
SAFETY DESIGN OF
PATTERNS AND TWO PHASE PRESSURE DROP*
CONTROL OF TRITIUM IN LMFBR
CONTROL OF TRITIUM IN LMFBR
ENERGY RELEASE FROM SEVERE TRANSIENTS IN
LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF
RESPONSE TO QUESTION 310.32 -
AND STEAM SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II -
CHARACTERISTICS OF AGGLOMERATES OF
REMOVAL, DISASSEMBLY, AND EXAMINATION OF FERMI SECONDARY
INSTRUMENTATION* UNDER
SECONDARY SODIUM PUMP*
SAFETY STUDIES*
CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1:
HYDROGEN DETECTOR IN
LEAK AN EQUILIBRIUM AND KINETIC STUDY OF THE LIQUID
HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM
OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO
U.S. PROGRAM FOR TESTING LARGE
DESIGN OF THE US-CRBRP
ANALYSIS OF LARGE
PURITY OF EBR-II

S(SUB N), IMPLICIT, MULTIFIELD, MULTICOMPONENT, EULERIAN, 122579 P 16
SAFE LMFBR'S* HYDRAULICALLY 128334 P 26
SAFETY - ANS 1977 WINTER MEETING* 130654 P 37
SAFETY ANALYSIS OF FAST BREEDER REACTORS* 130629 P 18
SAFETY ANALYSIS* VAPOUR PRESSURE MEASUREMENTS TO 7000 121738 P 25
SAFETY ASPECTS OF NUCLEAR ENERGY* 119262 P 1
SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 17
SAFETY CHARACTERISTICS IN LARGE LMFBR POWER PLANTS* 126176 P 49
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE 126673 P 18
SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE 126673 P 44
SAFETY DESIGN OF SNR-300* 126675 P 51
SAFETY ISSUES IN LICENSING COMMERCIAL LMFBR'S* 126672 P 5
SAFETY OF THE EBR-II STEAM GENERATOR* 126181 P 43
SAFETY OF THE LIQUID METAL COOLED FAST BREEDER REACTOR AND 124597 P 30
SAFETY RELATED CRITICAL EXPERIMENTS* 124107 P 17
SAFETY RESEARCH RELATED TO LMFBR ACCIDENTS* 124601 P 4
SAFETY STUDIES* 126864 P 12
SAFETY* 126453 P 5
SAFETY* 122559 P 25
SAFETY* 124676 P 36
SAMPLING AND CHARACTERIZATION FOR HAZARD EVALUATION* 129276 P 21
SCALE BREEDER REACTOR* 126870 P 5
SCALE FACILITY* 124989 P 39
SCALE LMFBR 217-PIN ELECTRICALLY HEATED FUEL ASSEMBLY* 129518 P 14
SCALE MODELS* 120378 P 29
SCARABEE SINGLE PIN IN-PILE BOILING EXPERIMENTS* 129504 P 14
SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING* 130651 P 35
SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD* EUROPE: 128622 P 6
SCTI FINAL REPORT* 121581 P 47
SEALS - 1969-1975* 121754 P 30
SEALS - 1969-1975* 121754 P 42
SECONDARY SODIUM PUMP* 129708 P 45
SEEMS THE BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY 128622 P 6
SEISMIC ANALYSIS FOR THE SUPER-PHENIX REACTOR* 126676 P 8
SEISMIC SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, 127604 P 8
SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY 127315 P 44
SELF-ACTIVATED SHUTDOWN SYSTEMS* 128969 P 26
SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR 121481 P 16
SERVICE INSPECTION AND MONITORING OF SELECTED COMPONENTS 127315 P 44
SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO PHASE PRESSURE DROP 129506 P 14
SEVERE TRANSIENTS IN SODIUM COOLED FAST REACTORS* 123197 P 16
SHIELD STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR* 124281 P 11
SHIPPING CASK ACCIDENT EVALUATION* 124041 P 9
SHIPPING-CASK APPLICATION* 127612 P 9
SHOCK TESTS OF PROTOTYPE EBR 'MONJU' SCALE MODELS* 120376 P 29
SHUTDOWN HEAT REMOVAL* 121327 P 10
SHUTDOWN SYSTEM COMPONENT FAILURE* 119877 P 46
SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR'S* 128334 P 26
SHUTDOWN SYSTEMS* 128969 P 26
SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS* 124927 P 25
SIMMER-I: AN S(SUB N), IMPLICIT, MULTIFIELD, 122579 P 16
SIMPLIFIED METHOD OF COMPUTING CLAD AND FUEL STRAIN AND 130974 P 35
SIMULANT TEST (FAST) PLAN* 127992 P 21
SIMULATED FULL-SCALE LMFBR 217-PIN ELECTRICALLY HEATED 129518 P 14
SIMULATED LMFBR FUEL ASSEMBLIES* 124787 P 12
SIMULATOR PROGRAM* 130967 P 45
SINGLE PIN IN-PILE BOILING EXPERIMENTS* 129504 P 14
SIZE FAST BREEDER REACTOR* 122438 P 43
SIZED LMFBRS* 121729 P 38
SIZED LMFBRS* 121729 P 36
SLEEVES* RESPONSE 119866 P 46
SLOWDOWN IN BRITAIN HELP ANYONE * 128881 P 7
SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE 121630 P 24
SNR-300 CONTAINMENT SYSTEM* 128326 P 34
SNR-300 MARK 1A CORE WITH MODELING OF FAILURE INCOHERENCE* 129502 P 14
SNR-300* 126675 P 51
SODIUM BOILING EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW 129506 P 14
SODIUM BY COLD TRAPPING* 119193 P 19
SODIUM BY COLD TRAPPING* 119193 P 36
SODIUM COOLED FAST REACTORS* 123197 P 16
SODIUM COOLED FAST REACTORS* OF SELECTED COMPONENTS 127315 P 44
SODIUM FIRE EFFECT ON CONTROL ROOM HABITABILITY* 119899 P 47
SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, 120349 P 10
SODIUM OXIDE AEROSOL PARTICLES* 129277 P 21
SODIUM PUMP* SODIUM 129708 P 45
SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-CORE 127647 P 26
SODIUM REMOVAL, DISASSEMBLY, AND EXAMINATION OF FERMI 129708 P 45
SODIUM SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR 126864 P 12
SODIUM TEMPERATURE AND STEAM CYCLE CONDITIONS* PHASE II: 130874 P 15
SODIUM* 121634 P 24
SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM-WATER 120154 P 24
SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, 120349 P 10
SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS*KINETIC STUDY 120154 P 24
SODIUM-WATER REACTION EFFECTS* 121639 P 22
SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM* 121641 P 29
SODIUM-WATER REACTIONS IN THE UNITED STATES* 121642 P 22
SODIUM: 1967-1974* 121474 P 42

ANALYSIS TECHNIQUES* SEISMIC
LABORATORY DEVELOPMENT OF
TRANSIENT OVERPOWER ACCIDENT IN LMFBR'S*
DEVELOPMENT OF TECHNICAL SPECIFICATIONS FOR EBR-II:
MULTI-FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH
APPLICATION TO COMMERCIAL LMFBR'S* DEVELOPMENT OF TECHNICAL
CALCULATION OF FAST BREEDER
FOR DECAY STORAGE OF LIQUID-METAL FAST BREEDER REACTOR
FACILITY* LMFBR
LABORATORY DEVELOPMENT OF SOLVENT EXTRACTION PROCESS FOR
LMFBR
STUDIES* SODIUM
* USERS MANUAL FOR THE BEHAVE-
DETERMINATION OF A NECESSARY HEIGHT FOR A
CREEP DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/308
TEMPERATURE, STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304
OF PHENIX* SAFETY CONCLUSIONS FROM
OF PHENIX* SAFETY CONCLUSIONS FROM
OF FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY
USERS MANUAL FOR THE BEHAVE-SST (STEADY
VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF
THE USSR FAST REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT
RIVER BREEDER* FINAL ENVIRONMENTAL
ANALYSIS OF LARGE SODIUM-WATER REACTIONS IN THE UNITED
APPLICATION OF CONTAINMENT CODES TO LMFBRS IN THE UNITED
STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, AND
PROGRAMME* PROGRAMME AND CURRENT
MODELS OF FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER
USERS MANUAL FOR THE BEHAVE-SST (
III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND
FAIL-SAFETY OF THE EBR-II
FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND
DURING CREEP AND CYCLIC TESTS OF TYPE 304 STIANLESS
DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS
STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO
STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS
DEVELOPED DURING CREEP AND CYCLIC TESTS OF TYPE 304
011.14 - BOTTLING OF AR-39 AND KR-85 FROM CRYOGENIC
ELEMENTS- CONSIDERATIONS FOR USE OF WATER COOLANT FOR DECAY
THE BREEDER
A SIMPLIFIED METHOD OF COMPUTING CLAD AND FUEL
STEEL: A COMPILATION, MULTIPLE ELEVATED-TEMPERATURE,
METAL FAST A STUDY OF POST-ACCIDENT MOLTEN FUEL DOWNWARD
A SIMPLIFIED METHOD OF COMPUTING CLAD AND FUEL STRAIN AND
STEEL* A COMPARISON OF METHODS USED TO DETERMINE REPORTED
HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS*
MODELS*
AND RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS STEEL
CONDENSATION OF FUEL ONTO THE ABOVE-CORE
CONDENSATION OF FUEL ONTO THE ABOVE-CORE
MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL SHIELD
CONCEPTUAL DESIGN
SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR SAFETY
FUEL ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND THEORETICAL
STUDIES. PART 3: BALANCE OF PLANT ENGINEERING SUPPORT
REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF
REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF
BREEDER REACTORS IN JAPAN*
FUEL* PHEBUS/UNTREX: A PRELIMINARY
LMFBR SPENT FUEL REPROCESSING: A
CHARACTERIZATION AND AGING KINETICS
THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL A
RELEVANCE TO SODIUM-WATER LEAK AN EQUILIBRIUM AND KINETIC
MOLTEN LIQUID METAL COOLED REACTORS* A
EXPERIMENTAL
1977* THORIUM ASSESSMENT
FFYF ELECTRICAL SYSTEM RELIABILITY
HEIGHT FOR A STACK CLOSE TO A BUILDING--A WIND TUNNEL
THE PREDICTION OF TEMPERATURE DISTRIBUTION OF A
ACCIDENT IN LMFBR'S* SOME ASPECTS OF
COOLANT MIXING AND
MECHANICAL RESPONSE OF UO2
CONCEPTUAL DESIGN DESCRIPTION, 3000-KWE
TYPE 304 STIANLESS STEEL (HEAT 9T2796)*
DEVELOPMENT. VOLUME 1 - NEAR-TERM ENERGY PROGRAM* EXECUTIVE
FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW*
CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE
CLINCH RIVER BREEDER REACTOR PLANT TECHNICAL REVIEW,
SEISMIC ANALYSIS FOR THE
TESTS IN
III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT ENGINEERING
SAFE LMFBR'S* HYDRAULICALLY
SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, VOLUME I - 127604 P 8
SOLVENT EXTRACTION PROCESS FOR SPENT LMFBR FUELS* 122839 P 38
SOME ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED 125644 P 17
SOME CONSIDERATIONS FOR APPLICATION TO COMMERCIAL LMFBR'S* 128323 P 44
SPACE-TIME KINETICS: FX2/VENUS-III* 126688 P 12
SPECIFICATIONS FOR EBR-II: SOME CONSIDERATIONS FOR 128323 P 44
SPECTRA* 126713 P 18
SPENT FUEL ELEMENTS--A LITERATURE SURVEY* OF WATER COOLANT 125292 P 39
SPENT FUEL REPROCESSING: A STUDY OF AN INDUSTRIAL-SCALE 124989 P 39
SPENT FUEL SHIPPING CASK ACCIDENT EVALUATION* 124041 P 9
SPENT LMFBR FUELS* 122839 P 38
SPENT-FUEL CHARACTERIZATION FOR SHIPPING-CASK APPLICATION* 127612 P 9
SPRAY CODE USER'S REPORT* 124743 P 31
SPRAY RELEASE ACCIDENT ANALYSIS FOR FAST REACTOR SAFETY 126864 P 12
SST (STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM 128006 P 13
STACK CLOSE TO A BUILDING--A WIND TUNNEL STUDY* 118387 P 41
STAINLESS STEEL STRUCTURAL WELDMENTS* 127472 P 31
STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION 123913 P 30
START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR 126673 P 18
START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR 126673 P 44
STATE AND TRANSIENT CONDITIONS* MODELS 125653 P 20
STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM* 128006 P 13
STATE OF OXIDE FUELS FOR FAST REACTOR SAFETY ANALYSIS* 121738 P 25
STATE* 124530 P 4
STATEMENT RELATED TO CONSTRUCTION AND OPERATION OF CLINCH 121273 P 47
STATES* 121642 P 22
STATES* 127820 P 33
STATISTICAL ANALYSIS* FATIGUE DATA ON TYPE 304 STAINLESS 123913 P 30
STATUS AND PROSPECTS OF THE FRENCH FAST BREEDER REACTOR 124494 P 4
STATUS AND PROSPECTS OF THERMAL BREEDERS* 124692 P 5
STATUS OF FAST BREEDER REACTOR DEVELOPMENT IN JAPAN* 124481 P 3
STEADY STATE AND TRANSIENT CONDITIONS* 125653 P 20
STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM* 128006 P 13
STEAM CYCLE CONDITIONS*PHASE II: CONCEPTUAL DESIGN. VOLUME 130874 P 15
STEAM GENERATOR* 126181 P 43
STEAM GENERATORS*ENGINEERING HANDBOOK - VOLUME II - SODIUM 120349 P 10
STEEL (HEAT 9T2796)* SUBSTRUCTURES DEVELOPED 129405 P 34
STEEL STRUCTURAL WELDMENTS* CREEP 127472 P 31
STEEL* A COMPARISON OF METHODS USED TO DETERMINE REPORTED 127484 P 32
STEEL: A COMPILATION, MULTIPLE LINEAR REGRESSION MODEL, 123913 P 30
STIANLESS STEEL (HEAT 9T2796)* SUBSTRUCTURES 129405 P 34
STILL* RESPONSE TO QUESTION 120928 P 47
STORAGE OF LIQUID-METAL FAST BREEDER REACTOR SPENT FUEL 125292 P 39
STORY* 123704 P 3
STRAIN AND STRESS DURING IRRADIATION* 130974 P 35
STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS 123913 P 30
STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID 124281 P 11
STRESS DURING IRRADIATION* 130974 P 35
STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO 127484 P 32
STRUCTURAL RESPONSE OF FAST BREEDER REACTORS TO 120625 P 29
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR 'MONJU' SCALE 120378 P 29
STRUCTURAL WELDMENTS* CREEP DEFORMATION 127472 P 31
STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* 130653 P 23
STRUCTURE DURING AN LMFBR CORE-DISRUPTIVE ACCIDENT* 130653 P 34
STRUCTURE IN THE LIQUID METAL FAST BREEDER REACTOR* 124281 P 11
STUDIES OF AN ADVANCED CORE RESTRAINT SYSTEM* 129945 P 50
STUDIES* SODIUM 126864 P 12
STUDIES* BLOCKAGES IN LMFBR 128452 P 13
STUDIES* PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF 130876 P 50
STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM CYCLE 130874 P 15
STUDIES. PART 3: BALANCE OF PLANT ENGINEERING SUPPORT 130876 P 50
STUDIES, DESIGN, AND DEVELOPMENT OF COMMERCIAL FAST 129737 P 49
STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR 120171 P 16
STUDY OF AN INDUSTRIAL-SCALE FACILITY* 124989 P 39
STUDY OF GAMMA PRIME ALLOYS FOR BREEDER REACTORS* 127563 P 32
STUDY OF POST-ACCIDENT MOLTEN FUEL DOWNWARD STREAMING 124281 P 11
STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION AND ITS 120154 P 24
STUDY OF THE REACTIVITY EFFECT OF PEBBLE COLLAPSE IN 129508 P 18
STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL TO AN HCDA* 128659 P 34
STUDY QUARTERLY PROGRESS REPORT FOR THIRD QUARTER FISCAL 131030 P 51
STUDY* 122043 P 28
STUDY* DETERMINATION OF A NECESSARY 118387 P 41
SUBASSEMBLY INCLUDING INTERSUBASSEMBLY HEAT TRANSFER* 128456 P 13
SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER 125644 P 17
SUBCHANNEL VELOCITIES IN AN LMFBR FUEL ASSEMBLY* 122799 P 11
SUBJECTED TO TRANSIENT HEATING* 126529 P 31
SUBSEA NUCLEAR POWER PLANT* 127503 P 49
SUBSTRUCTURES DEVELOPED DURING CREEP AND CYCLIC TESTS OF 129405 P 34
SUMMARY - NEEDS FOR ENERGY-RELATED MATERIALS RESEARCH AND 127564 P 32
SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED 129931 P 34
SUMMARY* LIQUID METAL FAST BREEDER REACTOR 127511 P 49
SUMMER 1977* 127515 P 6
SUPER-PHENIX REACTOR* 126578 P 8
SUPERPHENIX: A FULL SCALE BREEDER REACTOR* 126870 P 5
SUPPORT OF LMFBR* 127823 P 23
SUPPORT STUDIES* PHASE II: CONCEPTUAL DESIGN. VOLUME 130876 P 50
SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY 128334 P 26

LMFBR FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE FRUMP* 122592 P 30
FAST BREEDER REACTOR SPENT FUEL ELEMENTS--A LITERATURE SURVEY* OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL 125292 P 39
RESPONSE TO QUESTION 222.47 - SHUTDOWN SYSTEM COMPONENT FAILURE* 119877 P 46
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 19
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 36
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM DESIGN DESCRIPTION* 129944 P 50
HYDROGEN AND OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.* 121635 P 24
HYDRAULICALLY SUPPORTED ABSORBER BALLS SHUTDOWN SYSTEM FOR INHERENTLY SAFE LMFBR'S* 124334 P 26
ASSESSMENT OF A HIGH-INTEGRITY PROTECTIVE SYSTEM FOR LOSS OF ELECTRIC POWER* 124318 P 28
FFTF ELECTRICAL SYSTEM RELIABILITY STUDY* 122043 P 28
DESIGN REQUIREMENTS FOR THE SNR-300 CONTAINMENT SYSTEM* 128326 P 34
CONCEPTUAL DESIGN STUDIES OF AN ADVANCED CORE RESTRAINT SYSTEM* 129945 P 50
OF THE US-CRBRP SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM* DESIGN 121641 P 29
COMMUNICATIONS SYSTEMS CLINCH RIVER BREEDER PLANT SYSTEM DESIGN 129944 P 50
LMFBR SELF-ACTIVATED SHUTDOWN SYSTEMS* 128969 P 26
- ANS INTERNATIONAL CONFERENCE ON ADVANCED NUCLEAR ENERGY SYSTEMS* 1976 ASME 124774 P 51
AND ITS RELEVANCE TO SODIUM-WATER LEAK DETECTION IN LMFBR SYSTEMS* STUDY OF THE LIQUID SODIUM-HYDROGEN REACTION 120154 P 24

1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK B: POST-ACCIDENT HEAT REMOVAL. FINAL REPORT JULY 1, 122103 P 11
1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 122105 P 2
1, 1975-SEPTEMBER 30, 1976* LMFBR FUEL ANALYSIS TASK C: RELIABILITY ASPECTS OF LMFBRS. FINAL REPORT JULY 122105 P 48
INTERACTION ANALYSIS GUIDELINES, VOLUME I - ANALYSIS SEISMIC SOIL/STRUCTURE TECHNIQUES* 127604 P 8
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 2
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 38
MATERIALS SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING* 130851 P 35
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LIQUID METAL TECHNOLOGY IN ENERGY PRODUCTION* 124943 P 43
POSTACCIDENT HEAT REMOVAL TECHNOLOGY* 120963 P 10
DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM CYCLE CONDITIONS* II: CONCEPTUAL 130874 P 15
CABLES* TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL 123867 P 25
SIMULATED LMFBR FUEL ASSEMBLIES* TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-PIN 124787 P 12
INTERSUBASSEMBLY HEAT TRANSFER* THE PREDICTION OF TEMPERATURE DISTRIBUTION OF A SUBASSEMBLY INCLUDING 128456 P 13
STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR ELEVATED- TEMPERATURE, STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304 123913 P 30
RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR- TERM ENERGY PROGRAM* EXECUTIVE SUMMARY - NEEDS FOR ENERGY- 127504 P 32
FUEL AEROSOL SIMULANT TEST (FAST) PLAN* 127992 P 21
UNPROTECTED LOSS OF SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL MOTION RESULTING FROM 129931 P 34
FUEL DYNAMICS LOSS-OF-FLOW TEST L3 (FINAL REPORT)* 122810 P 11
CRACK PROPAGATION TESTING FOR LMFBR PIPING - PHASE II FINAL REPORT* 127586 P 32
FFTF HTS/DHX PROTOTYPE MODULE TESTING IN SCTI FINAL REPORT* 121581 P 47
U.S. PROGRAM FOR ENVIRONMENTAL TESTING LARGE SODIUM-WATER REACTION EFFECTS* 121639 P 22
POWER PLANTS* TESTING OF CLASS 1E AC MOTOR CONTROL CENTER FOR NUCLEAR 127832 P 33
ELECTRICALLY HEATED FUEL NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-PIN 129518 P 14
* SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX 126673 P 18
* SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF PHENIX 126673 P 44
TESTS IN SUPPORT OF LMFBR* 127823 P 23
RESULTS OF SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE U.S.* 121630 P 24
A PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL* PHOEBUS/UHTREX: 120171 P 16
STRUCTURAL SHOCK TESTS OF PROTOTYPE EBR 'MONJU' SCALE MODELS* 120378 P 29
SUBSTRUCTURES DEVELOPED DURING CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (HEAT 9T2796)* 129405 P 34
UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN-CORE INSTRUMENTATION* 127647 P 26
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL* 110919 P 24
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL CABLES* 123867 P 25
BREEDER REACTOR FUEL ASSEMBLY INLET/OUTLET NOZZLE FLOW TEST3* CLINCH RIVER 125973 P 48
AND LMFBR FUELS: FABRICATION AND REPROCESSING PROBLEMS AND THEIR RESOLUTION* PROBLEM FOR LWR PLUTONIUM RECYCLE 127498 P 40
LMFBR ACCIDENT ENERGETICS AND THEIR ROLE IN LICENSING* 128320 P 23
BOILING EXPERIMENTS* THEORETICAL INTERPRETATION OF SCARABEE SINGLE PIN IN-PILE 129504 P 14
IN LMFBR FUEL ASSEMBLIES - A REVIEW OF EXPERIMENTAL AND THEORETICAL STUDIES* BLOCKAGES 128452 P 13
STATUS AND PROSPECTS OF THERMAL BREEDERS* 124692 P 5
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING 118919 P 24
MATERIAL* THIN LINK* 126908 P 6
NUCLEAR POWER AND WEAPONS PROLIFERATION - THE THIRD QUARTER FISCAL 1977* 131030 P 51
THORIUM ASSESSMENT STUDY QUARTERLY PROGRESS REPORT FOR THIRD QUARTER FISCAL 1977* 131030 P 51
ASSESSMENT OF THE THORIUM ASSESSMENT STUDY QUARTERLY PROGRESS REPORT FOR 131030 P 51
PROLIFERATION WORRY THORIUM FUEL CYCLE IN POWER REACTORS* 126357 P 39
THREATENS TOTAL NUCLEAR OPTION* 123381 P 3
THREE YEARS OF PHENIX OPERATION* 127247 P 44
PRODUCT TRANSPORT ANALYSIS, QUARTERLY PROGRESS REPORT JULY THROUGH SEPTEMBER 1976* FISSION 123859 P 20
A STUDY OF POST-ACCIDENT MOLTEN FUEL DOWNWARD STREAMING THROUGH THE AXIAL SHIELD STRUCTURE IN THE LIQUID METAL 124281 P 11
SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER 128622 P 6
FIELD HYDRODYNAMIC DISASSEMBLY CALCULATIONS WITH SPACE- TIME KINETICS: FAX/VENUS-III* MULTI- 126688 P 12
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE- TO-DUCT INTERACTION* 127686 P 33
FFM) FACILITY* FABRICATION OF AN IMPROVED TUBE- TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE MOCKUP (129205 P 49
FUSION SEEMS THE BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, 128622 P 6
FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE BYWORD* EUROPE: TILTING TOWARD 128622 P 6
PROLIFERATION WORRY THREATENS TOTAL NUCLEAR OPTION* 123381 P 3
WELL; TOMORROW, FUSION SEEMS THE BYWORD* EUROPE: TILTING TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES 128622 P 6
BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE AND STEAM 130874 P 15
BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT ENGINEERING 130876 P 50
FFTF OPERATIONS: INITIAL OPERATOR TRAINING SIMULATOR PROGRAM* 130967 P 45
HEAT TRANSFER CORRELATION FOR ANALYSIS OF CRBRP ASSEMBLIES* 128256 P 12
THE IMPORTANCE OF HEAT TRANSFER IN HYPOTHETICAL CORE DISRUPTIVE ACCIDENTS* 129901 P 15
ELECTRICALLY HEATED FUEL ASSEMBLY* NATURAL CIRCULATION HEAT TRANSFER TESTING WITH A SIMULATED FULL-SCALE LMFBR 217-PIN 129518 P 14
OF A SUBASSEMBLY INCLUDING INTERSUBASSEMBLY HEAT TRANSFER* THE PREDICTION OF TEMPERATURE DISTRIBUTION 128456 P 13
NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT EXCHANGERS, AND STEAM 120349 P 10
WITH DIGITAL COMPUTER CODES (IN GERMAN)* CONTRIBUTION TO TRANSIENT ANALYSES OF GAS COOLED FAST BREEDER REACTORS 120341 P 10
GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY STATE AND TRANSIENT CONDITIONS* MODELS OF FISSION 125653 P 20

MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT HEATING* 126529 P 31
SOME ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER ACCIDENT IN LMFBR'S* 125644 P 17
UNPROTECTED LOSS OF FLOW* SUMMARY AND EVALUATION OF TRANSIENT TEST DATA ON EXTENDED FUEL MOTION RESULTING FROM 129931 P 34
A PRELIMINARY STUDY OF A LOW-COST FACILITY FOR TRANSIENT TESTS OF LMFBR FUEL* PHOEBUS/UHTREX: 120171 P 16
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL* 118919 P 24
USERS MANUAL FOR THE BEHAVE-SST (STEADY STATE AND TRANSIENT) FUEL ROD MECHANICS PROGRAM* 128006 P 13
ENERGY RELEASE FROM SEVERE TRANSIENTS IN SODIUM COOLED FAST REACTORS* 123197 P 16
REVIEW OF THE TRANSITION PHASE OF CORE-DISRUPTIVE ACCIDENTS IN LMFBRS* 125632 P 17
REMOTE SIGNAL TRANSMISSION FOR LIQUID METAL FAST BREEDER REACTORS* 124927 P 25
SEPTEMBER 1976* FISSION PRODUCT TRANSPORT ANALYSIS, QUARTERLY PROGRESS REPORT JULY THROUGH 123859 P 20
ANALYSIS OF FUEL REPROCESSING, REFABRICATION AND TRANSPORTATION* OF LMFBR ADVANCED FUELS: A RADIOLOGICAL 121348 P 38
IN FRENCH)* PROBLEMS RAISED BY THE PRESENCE OF TRANSURANIC ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (120966 P 38
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 19
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 36
COST OF 20-YEAR DELAY COULD BE $3.5 TRILLION* 126907 P 6
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 19
CONTROL OF TRITIUM IN LMFBR SODIUM BY COLD TRAPPING* 119193 P 36
APPARATUS FOR THERMAL TRANSIENT TUBE BURST TESTS ON LMFBR CLADDING MATERIAL* 118919 P 24
MOCKUP (FFM) FACILITY* FABRICATION OF AN IMPROVED TUBE-TO-PIPE HEADER HEAT EXCHANGER FOR THE FUEL FAILURE 129205 P 49
* TUBULAR GAGE FOR A LIQUID-METAL-COOLED FAST BREEDER REACTOR 129239 P 27
A NECESSARY HEIGHT FOR A STACK CLOSE TO A BUILDING--A WIND TUNNEL STUDY* DETERMINATION OF 118387 P 41
EXPERIMENTS IN A SEVEN-PIN BUNDLE: FLOW PATTERNS AND TWO PHASE PRESSURE DROP* SODIUM BOILING 129506 P 14
QUARTERLY PROGRESS REPORT ON THE ADVANCED TWO-PHASE INSTRUMENTATION PROGRAM FOR JANUARY-MARCH 1977* 127835 P 19
ELEVATED-TEMPERATURE, STRAIN-CONTROLLED FATIGUE DATA ON TYPE 304 STAINLESS STEEL: A COMPILATION, MULTIPLE LINEAR 123913 P 30
SUBSTRUCTURES DEVELOPED DURING CREEP AND CYCLIC TESTS OF TYPE 304 STAINLESS STEEL (HEAT 9T2756)* 129405 P 34
CREEP DEFORMATION AND RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS STEEL STRUCTURAL WELDMENTS* 127472 P 31

EFFECTS* U.S. PROGRAM FOR TESTING LARGE SODIUM-WATER REACTION 121639 P 22
OF SMALL LEAK BEHAVIOR AND DAMAGE PROPAGATION TESTS IN THE U.S.* RESULTS 121630 P 24
AND OXYGEN LEAK DETECTOR SYSTEM DEVELOPMENTS IN THE U.S.* HYDROGEN 121635 P 24
FAST REACTOR FUEL REPROCESSING IN THE UK* 124449 P 39
APPLICATION OF FORSS SENSITIVITY AND UNCERTAINTY METHODOLOGY TO FAST REACTOR BENCHMARK ANALYSIS* 121481 P 16
CORE INSTRUMENTATION* UNDER SODIUM RELIABILITY TESTS ON CORE COMPONENTS AND IN- 127647 P 26
MODELS OF FISSION GAS BEHAVIOR IN FAST REACTOR FUELS UNDER STEADY STATE AND TRANSIENT CONDITIONS* 125653 P 20
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 2
LMFBR - FUEL CYCLE TECHNOLOGIES UNDERDEVELOPED--GAO* 121108 P 38
BREEDER REACTOR* UNITED KINGDOM NEARS DECISION ON COMMERCIAL-SIZE FAST 122530 P 43
ANALYSIS OF LARGE SODIUM-WATER REACTIONS IN THE UNITED STATES* 121642 P 22
APPLICATION OF CONTAINMENT CODES TO LMFBRS IN THE UNITED STATES* 127820 P 33
TRANSIENT TEST DATA ON EXTENDED FUEL MOTION RESULTING FROM UNPROTECTED LOSS OF FLOW* SUMMARY AND EVALUATION OF 129931 P 34
SOME ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER ACCIDENT IN LMFBR'S* 125644 P 17
MECHANICAL RESPONSE OF UO2 SUBJECTED TO TRANSIENT HEATING* 126529 P 31
PHENIX* SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF 126673 P 18
PHENIX* SAFETY CONCLUSIONS FROM START-UP TESTS AND FROM THE ANALYSIS OF THE CORE BEHAVIOUR OF 126673 P 44
URANIUM INDUSTRY BALKS AT KICK FROM CARTER* 129524 P 7
DESIGN OF THE US-CRBRP SODIUM-WATER REACTION PRESSURE RELIEF SYSTEM* 121641 P 29
DECONTAMINATION AND DECOMMISSIONING CRITERIA FOR USE IN DESIGN OF NEW PLUTONIUM FACILITIES* 119248 P 38
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 19
EVALUATION OF AIR CLEANING SYSTEM CONCEPTS FOR EMERGENCY USE IN LMFBR PLANTS* 121014 P 36
FAST BREEDER REACTOR SPENT FUEL CONSIDERATIONS FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL 125292 P 39
FOR ANNEALED 2.25 CR-1MO STEEL* A COMPARISON OF METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES 127484 P 32
SPRAY CODE USER'S REPORT* 124743 P 31
TRANSIENT) FUEL ROD MECHANICS PROGRAM* USERS MANUAL FOR THE BEHAVE-SST (STEADY STATE AND 128006 P 13
LMFBR FUEL PIN BEHAVIOR: A LIMITED PARAMETER SURVEY USING THE CODE FRUMP* 122592 P 30
* THE USSR FAST REACTOR DEVELOPMENT PROGRAM AND ITS CURRENT STATE 124530 P 4

METHODS USED TO DETERMINE REPORTED STRESS RUPTURE MINIMUM VALUES FOR ANNEALED 2.25 CR-1MO STEEL* A COMPARISON OF 127484 P 32
STATE OF OXIDE FUELS FOR FAST REACTOR SAFETY ANALYSIS* VAPOUR PRESSURE MEASUREMENTS TO 7000 K AND EQUATION OF 121738 P 28
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION* 127686 P 33
COOLANT MIXING AND SUBCHANNEL VELOCITIES IN AN LMFBR FUEL ASSEMBLY* 122799 P 11
LMFBR NATURAL CIRCULATION VERIFICATION PROGRAM (NCVP)* 127684 P 13
EX- VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 30
EX- VESSEL CORE RETENTION CONCEPT FOR EARLY SIZED LMFBRS* 121729 P 36
EXPERIMENTAL STUDY ON DYNAMIC RESPONSE OF REACTOR VESSEL TO AN HCDA* 128659 P 34
LMFBR'S* SOME ASPECTS OF SUBASSEMBLY VOIDING IN THE UNPROTECTED TRANSIENT OVERPOWER ACCIDENT IN 125644 P 17
ERDA-EPRI LMFBR DESIGN PROJECTS PHASE II FINAL REPORT VOL. B2 PLBR BALANCE OF PLANT DESIGN CHARACTERISTICS* 129918 P 50
TEMPERATURE AND VOLTAGE TESTS ON MGO INSULATED COAXIAL CABLES* 123867 P 25
SEISMIC SOIL/STRUCTURE INTERACTION ANALYSIS GUIDELINES, VOLUME I - ANALYSIS TECHNIQUES* 127604 P 8
EXCHANGERS, AND STEAM SODIUM-NAK ENGINEERING HANDBOOK - VOLUME II - SODIUM FLOW, HEAT TRANSFER, INTERMEDIATE HEAT 120349 P 10
LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 1: SODIUM TEMPERATURE 130874 P 15
LARGE BREEDER REACTOR. PHASE II: CONCEPTUAL DESIGN. VOLUME III: TRADEOFF STUDIES. PART 3: BALANCE OF PLANT 130876 P 50
FAST BREEDER REACTOR CONCEPTUAL PLANT DESIGN, 1000 MWE. VOLUME 1 - EXECUTIVE SUMMARY* LIQUID METAL 127511 P 49
FOR ENERGY-RELATED MATERIALS RESEARCH AND DEVELOPMENT. VOLUME 1 - NEAR-TERM ENERGY PROGRAM* SUMMARY - NEEDS 127604 P 32

TEMPERATURE DISTRIBUTION IN THE DUCT WALL OF 19-PIN SIMULATED LMFBR FUEL ASSEMBLIES* 124787 P 12
OF TRANSURANIC ELEMENTS IN NUCLEAR FUEL REPROCESSING WASTES (IN FRENCH)* PROBLEMS RAISED BY THE PRESENCE 120966 P 38
BREEDER REACTOR SPENT FUEL CONSIDERATIONS FOR USE OF WATER COOLANT FOR DECAY STORAGE OF LIQUID-METAL FAST 125292 P 39
LIQUID SODIUM-HYDROGEN REACTION AND ITS RELEVANCE TO SODIUM- WATER LEAK DETECTION IN LMFBR SYSTEMS*KINETIC STUDY OF THE 126154 P 24

U.S. PROGRAM FOR TESTING LARGE SODIUM- WATER REACTION EFFECTS* 121639 P 22
DESIGN OF THE US-CRBRP SODIUM- WATER REACTION PRESSURE RELIEF SYSTEM* 121641 P 29
ANALYSIS OF LARGE SODIUM- WATER REACTIONS IN THE UNITED STATES* 121642 P 22
NUCLEAR POWER AND WEAPONS PROLIFERATION - THE THIN LINK* 126908 P 6
WELDING DEVELOPMENT FOR LMFBR APPLICATIONS* 126285 P 31
RUPTURE BEHAVIOR IN TYPE 304/308 STAINLESS STEEL STRUCTURAL WELDMENTS* CREEP DEFORMATION AND 127472 P 31
TOWARD FUSION - TODAY THE FRENCH PHENIX BREEDER SCORES WELL; TOMORROW, FUSION SEEMS THE #YWORD* EUROPE: TILTING 128622 P 6
FLOWER POWER-- WILL A NUCLEAR POWER SLOWDOWN IN BRITAIN HELP ANYONE * 128881 P 7
OF A NECESSARY HEIGHT FOR A STACK CLOSE TO A BUILDING--A WIND TUNNEL STUDY* DETERMINATION 118387 P 41
MATERIALS SCIENCE AND TECHNOLOGY - ANS 1977 WINTER MEETING* 130861 P 36
NUCLEAR REACTOR SAFETY - ANS 1977 WINTER MEETING* 130854 P 37
THE RESPONSE OF VARIOUS WIRE-WRAP ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION* 127686 P 33
INSPECTION AND MONITORING OF SELECTED COMPONENTS LOCATED WITHIN OR PART OF THE PRIMARY CONTAINMENT OF SODIUM COOLED 127316 P 44
PROLIFERATION WORRY THREATENS TOTAL NUCLEAR OPTION* 123381 P 3
THE RESPONSE OF VARIOUS WIRE- WRAP ASSEMBLIES TO BUNDLE-TO-DUCT INTERACTION* 127686 P 33

COST OF 20- YEAR DELAY COULD BE $3.5 TRILLION* 126907 P 6
ONE YEAR OF PHENIX OPERATION* 116480 P 42
THREE YEARS OF PHENIX OPERATION* 127247 P 44

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